THE MARKET FOR YELLOW SKINNED CHICKENS

JANET H. CUMBERLAND

UNIVERSITY OF NEWCASTLE UPON TYNE

DEPARTMENT OF AGRICULTURAL MARKETING

REPORT No. 17 1973 £1.00

THE MARKET FOR YELLOW SKINNED CHICKENS

Janet H. Cumberland

UNIVERSITY OF NEWCASTLE UPON TYNE

Department of Agricultural Marketing

Report No. 17 1973 £1.00

ACKNOWLEDGEMENTS

The writer wishes to acknowledge the help of numerous organisations and individuals, in particular, the U.S. Feed Grains Council who supported the work financially, Laws Stores Limited who provided the facilities for shop tests, Redheads Advertising Limited who produced the copy and conducted the advertising campaign, C. M. Varley & Co. Ltd., of Darlington for carefully mixing the special rations, Mr. A. Elliott of the Agricultural Development and Advisory Service and her colleagues in the Department of Agricultural Marketing.

C O N T E N T S

INTRODUCTION

It is generally accepted by feed manufacturers, processors and retailers that only white skinned chickens are acceptable to British consumers. Since whiteness of skin can only be achieved by excluding pigmented feedstuffs, the use of maize and other substances liable to colour the skin has to be carefully regulated, thus reducing flexibility of formulation in response to changing availability of feed components. Feed is the major item of cost in chicken production. Therefore, any possibility of increasing flexibility in formulating rations could lead, in the long run, to worthwhile decreases in total cost of production.

This report, therefore, examines in some detail consumer attitudes to yellow skinned chickens and willingness to buy them. It describes a series of experiments designed to discover the possibilities for marketing pigmented chickens in the United Kingdom.

Chapter I

EFFECTS ON SKIN COLOUR OF DIFFERENT LEVELS OF MAIZE IN CHICKEN DIETS

Though there has been much research on pigmentation which usually identifies levels of the main agent of pigmentation, Xanthophyll, this does not provide the answer to the first question to be answered by this investigation, that is, the effect of different percentages of maize on skin colour. In the United Kingdom whole maize levels in chicken diets are usually restricted to 12-15% because of the possibility of higher levels causing skin pigmentation. In order to see what effect more maize in the feed would have on skin colour, a trial was set up at Cockle Park in June, 1971.

Procedure

Four groups of chickens were fed on rations containing different levels of pigment. In three rations it was supplied by maize which was included at the rate of 25, 50 and 70% of the rations respectively. The fourth was based on wheat and a synthetic pigment was added. The rations were mixed on the farm and were designed to be nutritionally balanced (see Appendix I for rations). Ordinary commercial grain maize was used, samples being analysed after each mix to determine the xanthophyll level. Feed was mixed in 5 cwt batches to minimise the possibility of oxidation of pigments by other constituents and a coccidiostat was included.

Broiler chicks of popular commercial type were used (Ross). They arrived at day-old and were fed proprietary chick starter crumbs for the first five days, then changed gradually to the experimental rations. Each group contained 75 birds. All chicks were wing tagged for identification on arrival, injected against fowl pest at 21 days and treated for a mild bronchial infection in

the sixth week.

When the birds were 63 days old they were killed and processed at a commercial packing station. Temperature of scald was approximately 125°F. After defeathering skin colour was assessed, then processing was completed, and the birds were weighed and packed in plain clear polythene bags ready for consumer surveys.

Assessment of Skin Colour

First a subjective visual assessment was made of each bird using the 'rank' test. Chicken carcases are not uniformly coloured, nor do all birds deposit pigment in the back skin, the shanks and other areas to the same degree. For this reason the 'rank' test, in which all birds from one experiment are ranked according to their overall pigmentation, is a useful method of colour assessment[1]. Each bird was given a rank number according to its position in the sequence, e.g. 1 representing very light pigmentation, 5 heavy pigmentation. Differences between average group numbers indicated difference of pigmentation. The significance of the difference was evaluated by statistical means. The same operator evaluated all the birds. This method would not allow the results of two individual experiments to be compared, an objective determination of the degree of skin pigmentation being necessary for such a comparison.

Second an objective assessment was carried out. After consultation with a firm manufacturing optical instruments a reflectometer was chosen for the purpose. Reflectometry is the measurement of the amount of light given back by an illuminated surface. It is concerned with specularly reflected light (light regularly reflected in a narrow beam as from an optically smooth surface) and diffuse or scattered reflections from surfaces which are optically rough. The former produce the impression of gloss, the latter reveals surface characteristics such as colour. Taken together, both contribute to the total brightness of a given

area[2]. The instrument chosen was portable and it was possible to use it directly on each bird. Measurements of reflectance were taken from the same position on each chicken on the breast and leg.

These measurements were read off directly from a galvanometer and were in terms of percentage reflectance relative to a calibrated standard (in this case a magnesium carbonate block). A clear filter was used first but brightness measurements were also made in the red, blue and green regions of the spectrum. Differences between average group numbers showed the differences in reflectance, and the significance of these was evaluated by statistical means.

Results

Analyses of the feeds can be seen in Table 1.

Table 1

Feed (2 mixes)		Dry Matter %	Crude Protein	Crude Fibre	Ether Extract
Wheat and carophyll	1	85.6	21.9	3.7	2.5
	2	85.6	21.1	4.5	2.3
25% maize	1	86.1	21.2	3.4	3.7
	2	86.0	18.4	4.0	3.0
50% maize	1	86.2	20.8	4.3	3.7
	2	86.2	19.3	4.8	3.5
70% maize	1	86.7	20.3	4.8	4.9
	2	86.5	18.8	4.8	4.2

Because of the high energy content of maize it was impossible to obtain isocalorific rations using such simple mixes and the increasing level of maize (and therefore energy) is reflected in the oil percentages. Percentages of dry matter, crude protein, and fibre are similar. The xanthophyll level of the maize was

9 mg/lb.

Both the subjective and objective measurements of skin colour of the chickens fed on the four rations resulted in statistically significant differences between treatments at the 1% level. Originally each group was made up of 75 birds. Of these 70-72 in each group reached killing weight, the number of male and female birds being around 40% and 60% of the total respectively. (See Table 2.)

Table 2

Group	No. of Males	No. of Females	Total
1	28	44	72
2	31	40	71
3	33	37	70
4	26	44	70
Without tags	2	2	4

Calculations were based on the use of 50 measurements from each group, 25 from male and 25 from female birds, selected at random.

The results from the reflectometer readings agreed with those from the rank test. The group fed on the 25% maize diet showed least pigmentation and highest reflectance, and the 70% maize group greatest pigmentation and lowest reflectance. The group means are shown in Table 3.

The difference in reflectance between the filters was in accordance with physical principles, the red filter being nearest to yellow on the light spectrum consequently absorbing most light and showing no detectable difference in colour in the breast measurements. Differences between leg and breast readings are to be expected since the muscle under the skin of the leg is dark and that of the breast is light in colour.

Table 3

Rank Test		Wheat and Carophyll 2.06	25% Maize 1.6	50% Maize 2.82	70% Maize 3.44
Reflectance %					
Clear filter	breast	53.96	55.30	54.06	52.10
	leg	53.90	52.26	50.64	50.06
Red filter	breast	63.46	63.56	63.36	62.40
	leg	60.46	58.52	60.15	57.88
Blue filter	breast	35.36	37.92	32.44	30.06
	leg	38.30	38.96	35.02	31.92
Green filter	breast	48.24	49.86	47.66	46.24
	leg	48.32	47.68	47.14	44.60

It was noticed that some of the chickens appeared to have less densely pigmented skins. These were, therefore, marked on the record sheets and it was found that the majority came from the group fed on the wheat/synthetic carotenoid ration.

Table 4

Basis of Feed	Wheat and Carophyll	25% Maize	50% Maize	70% Maize
Number distinguishable	38	5	3	4
Number in group	68	72	70	70

An explanation could be that birds eating this ration put less fat on than other groups as the energy level of the diet was unavoidably lower than that of the maize ones. Fat covers the bluish colour of the muscle tissue that shows through the skin of poultry.

Difference in colour between birds fed on the wheat and carophyll and 25% maize diets was much smaller than between these two

groups and the higher maize diets. There was little variation in colour within groups.

From the practical point of view, the ranking method proved to be an adequate method of detecting colour differences. It was far quicker than using the reflectometer and involved less handling. Use of the clear filter only would have been sufficient to detect differences. Although objective measurements are usually considered to be more acceptable, as results from the reflectance measurements corroborated those from the rank test the latter is to be preferred for practical purposes.

Chapter II

CONSUMER ATTITUDES TO YELLOW PIGMENTED CHICKENS

In this chapter the second question is examined, namely, what is the attitude of consumers to pigmented chickens?

CONSUMER ATTITUDE STUDIES

The problem of pigmentation in roasting chickens is one about which feed manufacturers, growers, processors and retailers have very definite opinions - they believe that consumers will not buy yellow chickens. Although studies have been made in the US on consumers' preferences for degree of pigmentation, very little has been done in this country. In a survey on Consumers' Image of Broilers carried out in Texas[3] housewives were shown a series of four colour prints of chickens with pigmentation ranging from white to medium yellow to determine the approximate skin colour they preferred. Most preferred a degree of pigmentation, the degree depending on age of housewife, socio-economic group, and racial classification. In the UK where pigmented chickens are rarely seen, only 24% of respondents in a survey carried out in 1960[4] mentioned colour when answering the question, 'What are the most important points looked for when choosing chicken?'. When directly asked what colour they preferred the skin of a chicken to be, only 3% suggested a yellow-white colour. All the rest preferred white and very pale colours.

Because of the lack of information on this subject, therefore, it was decided to investigate attitudes to pigmentation first by qualitative means, that is using unstructured interviews, then by using information drawn from these to prepare and carry out surveys to obtain quantitative data.

The value of the qualitative approach is comprehensively summarised in S.C.P.R. Technical Manual No. 4[5].

Table 5: What Colour do you Prefer the Skin of Chicken to be?[4]

	Total 2913
	%
White	55
Whitish	7
White or Cream	4
Cream	9
Light/Pale	8
Slightly Pink	8
Yellow White	3
Others	-
No Preference/don't know	6

1. Qualitative research can play a useful role in its own right where the research aim is simply to uncover the range of variables.
2. It can mitigate some of the shortcomings of the normal structured approach to questionnaires by providing deeper insights into particular aspects.
3. It provides the basis for developing the structured questionnaires necessary for aggregating data.
4. It provides a means for respondents to influence the content of the study and the relative emphasis given to each aspect.

Obviously qualitative research has shortcomings, arising mainly from the fact that the results cannot easily be put together into a quantifiable structure. It is also impossible to say on the basis of qualitative research how many people hold particular views, or to identify their characteristics with any certainty; and there is a risk of interpreting results in an over-elaborate way.

A series of group and individual interviews, therefore, were held in June and July, 1971 in order to discover housewives' attitudes towards chicken. The objective was to find out not only consumer attitudes to the type of chicken sold at present for roasting, but also to evaluate reaction to the idea of a chicken whose

appearance was unconventional - that is, yellow skinned.

Two group and five individual interviews were held with housewives who regularly used chicken. Respondents' ages varied from the early twenties to late fifties, and all socio-economic groups were represented. Both group discussions, each involving six housewives, and three of the individual interviews took place in the University, two of the individual interviews in the participants' homes. All the interviews were recorded so that they could be listened to carefully afterwards and transcriptions were made from them. Three interviewers took part.

In all the interviews general attitudes towards chicken were explored first, and in both group discussions and four of the individual interviews the subject of colour came up naturally in connection with choosing a chicken, so that the topic did not have to be deliberately introduced.

A number of projective techniques such as sentence completion and word association were used in the individual interviews.

Findings

Chicken is generally regarded as being an economical meat, and most of the participants had no doubt that it was just as nutritious as any other. Some of them considered it to be an interesting and tasty meat, especially when served with all the traditional trimmings. Others thought it fairly tasteless but liked it for variety and because of its adaptability in numerous recipes.

Chicken pieces are not particularly popular and were condemned by most of the interviewees for being too small to satisfy the appetite and too expensive, but they are acknowledged to be useful for a quick meal.

It seems that quite a number of housewives in the Newcastle area prefer to buy chicken from their butcher, although supermarkets are an important source of frozen birds. Although frozen

chickens tend to be criticised for their tastelessness they are still bought in greater numbers than fresh ones.

People seem to recognise the fact that chicken is within the reach of everyone nowadays, but many recall that not too many years ago, it was a luxury only to be partaken of at Christmas or on special days and consequently it has happy associations for them.

On the whole these findings were in agreement with the O.B.M. Attitude and Usage Survey (September 1971), which reported housewives' attitudes towards chicken as generally good.

Turning to the specific consideration of colour, it is well known that it plays an important part in advertisement and selling. In the case of chickens it is probably the most important single factor governing choice for it carries connotations of the bird's health, fatness, flavour and tenderness.

The concept of yellowness in food produces an initial reaction of distaste, although interviewees soon recalled yellow food which they found attractive, such as butter, cheese, cornflakes, Indian corn, egg yolks and custard.

Food which is not the accustomed colour is immediately suspect, and white is the colour expected of chickens. It was generally agreed by the housewives that if chickens of a different colour were to appear on the market, explanations and reassurances would be needed, not necessarily as to why they were yellow but that they were perfectly wholesome and 'natural'. Reactions to the idea of yellowness in chickens were fairly varied. Some thought that they would be stale, old, dry or dyed; others said that they would think that the birds had been fed on special food (unwholesome implied), or that as meat is so expensive they couldn't afford to risk trying anything new. In favour were the ideas that the colour might appeal to the children, that so long as they were not too deep and dark they could look attractive, that they might look like free-range birds and therefore be desirable. There is very little interest in what chickens are fed on but there is a vague

though widespread feeling of distaste for the emotive term 'force-feeding' (although complete ignorance about it) and for the battery system which is regarded as the usual method of keeping all poultry. There are strongly positive feelings about the words 'free-range', 'natural', 'farmyard' and 'farm-fed'.

Pale, buttery yellow is considered attractive and a creamy white skin in chickens is strongly preferred to a blue-white, which is associated with ill-health; pink-white is acceptable.

Whiteness is associated in some minds with tastelessness - although chicken is not expected to be particularly tasty - and tenderness. Yellowness, by at least some people, is associated with juiciness but also fatness as in boiling fowl.

In summary, the interviews confirmed what is generally known from surveys on chicken consumption, and provided some ideas about possible point-of-sale promotional material for marketing pigmented chickens. It seemed that brand names and pattern designs on polythene bags containing chickens are fairly unimportant.

The interviews suggested that provided the housewife was convinced that yellow chickens were as good as or better than white ones, and she was reassured that the colour was perfectly wholesome, she would be willing to buy them. This sensible view was unfortunately shown to be untrue during the surveys and will be discussed further when the Consumer Preference results are analysed.

PRODUCT TESTS

Having investigated consumers' feelings towards the idea of yellow pigmented roasting chickens on a qualitative basis, the next step was to find out their reaction to the birds themselves in a quantitative way. For this, use was made of birds whose production was described in Chapter I. Four separate pieces of research were carried out:

1. A laboratory examination and testing of chickens of different colours, using an expert panel and assessing

preference before and after cooking as well as eating quality.

2. a) Consumer surveys in which pigmented chickens (fed on a 25% maize diet) were compared with white ones to obtain opinions on the appearance of the fresh birds and preferences for them.
   b) Consumer surveys as above but using frozen chickens.
3. A further consumer survey using fresh chickens but where an attempt was made to eliminate certain negative attitudes whose presence had been established from the previous surveys and from interviews.
4. Visual appraisals of pigmented and white birds in consumers' own homes before and after cooking, and assessment of eating quality.

The first intention was to obtain information about consumers' preferences for the appearance of chicken of different colours compared with white. The chickens were subjected to panel tests; appearance before and after cooking was judged, as well as eating quality. From these chickens a degree of yellowness was selected which was most acceptable to consumers and this was used in the next stage, which was the examination of consumer preferences between the chosen type and conventional chickens in consumer surveys. Eight surveys were carried out in all, five of them on a large scale and three on a much smaller scale. The large-scale surveys, three in Newcastle upon Tyne and two in Manchester, were done using fresh and frozen birds and the final survey in Newcastle tried to eliminate the affect of attitudes to chickens which were known to be inconsistent. The smaller surveys, which were in Leeds, Derby and Reading, were carried out with frozen birds only. The last step in this section of the investigation was the appearance and eating quality test held in consumers' homes to see whether the results obtained from a specially selected panel applied to a randomly selected cross section of the population.

Procedure

i) Visual Appraisal

To see how important the degree of pigmentation is to consumers, a preliminary test was carried out in the laboratory using one chicken from each of four pigmented groups plus a white chicken of conventional type. Pigmented birds were chosen at random from the groups, the only factor influencing choice being size. Sets of five chickens of equal weights were unpacked and laid side by side for inspection. The same panel, made up of female clerical workers, was required on each occasion to look at the chickens and to fill in a questionnaire stating preferences. The test was carried out on three consecutive days. After each visual appraisal all the chickens were roasted in foil in an electric oven at 450°F until a thermocouple placed in the deepest part of the breast muscle registered 76°C. The respondents were then asked to complete a second questionnaire indicating their preferences for the appearance of the cooked chickens.

ii) Taste Tests

The cooked chickens were then used in taste tests. The same panel was used as for the visual appraisal and it was made up of tasters already found to have a high ability to discriminate between flavours[6]. The selection of individuals to serve on taste panels depends on the purpose of the test. Where a consumer reaction only is required a trained panel is not needed and may be better avoided. However, for the purpose of an analysis of flavour differences it may be better to select panellists who have a superior ability to detect such differences. Since the object of tasting the chickens in this case was to find out whether feeding maize at different levels affected the flavour, it was decided to use tasters who had already shown themselves to be discriminating in previous meat tasting exercises. It has been shown[7] that a small number of trained panellists is adequate for detecting differences and that for mild-flavoured products, among which

chicken can be included, up to nine samples can be used per sitting. A system of scoring was shown by the same authors to be the most efficient procedure for assessment, and to lend itself well to an analysis of variance. For these reasons, each of the five tasters received five equal-sized pieces of chicken, one from each bird and separately wrapped in foil. The meat was taken from the breast of the chickens and all skin was removed. It was tasted while still warm. The tasters were asked to assess each piece for flavour, to taste in a predetermined order indicated by the colour of markers on the foil wrappers, and to allot a score to each piece. They were seated widely apart and did not communicate with one another during the test. As with the visual appraisals, the test was repeated on three consecutive days with the same panel. A Latin-square design was used for analysis so that variation due to tasters and tasting order could be controlled.

iii) Consumer Surveys

Areas Chosen: Consumer surveys were than carried out using the pigmented bird liked by the panel. The areas chosen were Newcastle upon Tyne, Manchester, Leeds, Derby and Reading. Regional differences in food consumption and expenditure are described in the National Food Survey[8] and, in general, consumption of poultry tends to be below the national average in the north of England but above the national average in the south. Diet in the SE/E Anglia region particularly contains more meat and poultry than in the rest of the country. Table 6 shows the consumption of chicken by region. Choice of area for surveying was made partly on the basis of these figures (Newcastle and Leeds comparatively low consumption, Derby and Manchester moderate, Reading high consumption) and partly for administrative reasons. Differences are not however very great.

Two surveys were done in Newcastle and Manchester, one on fresh and one on frozen chickens. In Leeds, Derby and Reading frozen chickens only were used and the sample was much smaller.

Table 6: Chicken Consumption (oz per person per week)

Year	All Households	Wales	Scotland	North	Yorks and Humberside	N.W.	E. Midlands	W. Midlands	S.E. and E. Anglia	S.W.	CONURBATIONS		OTHER URBAN AREAS			
											London	Provincial	Larger Towns	Smaller Towns	Semi-Rural Areas	Rural Areas
1966	2.66	1.70	1.28	1.79	2.16	2.66	2.50	2.52	3.12	2.65	3.80	2.48	2.96	2.15	2.21	1.36
1967	2.89	3.27	1.78	1.80	2.28	3.20	2.38	3.12	3.55	2.94	4.14	2.56	2.92	2.49	2.72	2.24
1968	3.19	3.72	2.17	2.16	2.52	3.14	3.44	2.96	3.69	3.70	4.44	2.68	2.96	3.32	3.11	2.41
1969	3.33	3.63	2.52	2.55	2.19	2.81	3.39	4.02	4.08	3.96	4.36	2.76	3.22	3.63	3.18	2.59

Source: Household Food Consumption and Expenditure 1958-1968.

The Sample

The main object of the survey was to determine customers' preferences for yellow or white chickens. Because the main purchasers of chickens are housewives it was decided to select a sample of respondents in a house-to-house survey using the random walk method, calling during the day and in the evening to avoid sampling only those who are at home all day[9]. The majority of the population consumes chicken at some time during the year (only 6.6% of the total sample obtained in this investigation said they never bought chicken, a figure in close agreement with the findings of the exhaustive chicken survey already quoted on page 8[4]) and it was felt that the random walk method would be suitable although it does offer possibilities of bias when sampling minority groups[10]. The towns to be sampled were divided into area blocks, the areas having been selected purposively, and a number of blocks were chosen at random for surveying. Interviewers were provided with a set of instructions designed to ensure that they did not allow conscious or unconscious personal motives to dictate their choice of house. In effect they had to call at every seventh house from the designated starting point, taking alternate right and left turns at road junctions and sampling left and right hand sides of the road alternately. In the event of uncertainty they were instructed to telephone for instructions.

The questionnaire and notes used in coding are included as Appendix II.

Consumer Surveys

Surveys in all the towns were carried out in the same way. Each interviewer carried a basket containing a white and a yellow chicken of the same size. These were wrapped in clear polythene bags and were marked with a plain white square and a plain white circular label respectively so that chickens could be distinguished without referring to their colour. Both fresh and frozen

chickens had to be replaced after two days. They were kept under refrigeration at night. During the first survey white chickens from a well-known store were used and their shape was compared unfavourably by some of the respondents with the shape of the yellow chickens. This resulted in the production of a second batch of chickens, two hundred this time, at the University farm, one group being fed a wheat-based diet (unpigmented), the second group on a 25% maize diet. Thus the possibility of chicken shape affecting consumers' reaction was removed, although it seems unlikely that this would have had much affect on the overwhelming preference for white chickens.

During the group and individual interviews already described it was suggested by several housewives that they would be more likely to buy the pigmented chickens if they knew the cause of the colour and were satisfied that it was harmless. As it was, they tended to condemn the yellow bird on the mistaken grounds that it would be stale, old and over-fat. In order to test this idea a final survey was carried out in Newcastle using fresh chickens. Each interviewer carried a small sample of maize grain in a clear polythene bag. Respondents were first asked whether they could identify the grain, and were informed where necessary that it was maize. A guide to the proportion of people recognising maize was thus acquired. The respondents were then told that the two chickens were 'both reared under the same conditions, prepared for market at the same age and were both completely fresh', and that the yellow one (referred to by its label) had been fed on a maize diet, the white one on a wheat diet. Their preference was then noted, with reasons as before.

Altogether 1,540 people were interviewed as follows:

Newcastle	'fresh' survey	178
	'frozen' survey	246
	final 'fresh' survey	278
Manchester	'fresh' survey	307
	'frozen' survey	230

Leeds	'frozen' survey	97
Derby	'frozen' survey	106
Reading	'frozen survey	98

Analysis

The information was edited, coded and prepared on punched cards for tabulation by computer. Social grades were based on the occupation of the head of the household, and where retired, on former occupation. A broad definition of the six socio-economic groups used can be found in the 1968 National Readership Survey[11].

iv) Household Tests

Finally the yellow and white chickens were tested by consumers in their own homes. A sample of households was obtained by the random walk technique in Newcastle and surveyed for family size, socio-economic group, respondent's age and frequency of chicken buying. From these were selected sixty households of chicken purchasers to test samples of pigmented and unpigmented chickens.

Chickens from the second batch reared at the Experimental Farm were used. It was felt that some participants might find it difficult to fit two whole chickens in their ovens at the same time, so in order to ensure that both samples were cooked at the same time and in the same way each household was given a white and a yellow half chicken of the same size. To differentiate between them one of the chickens was labelled with a metal tag. Housewives were asked to cook the chickens by their usual method. In all but one case (where the chickens were casseroled) the chicken halves were roasted. Questionnaires were provided asking for preference relative to appearance before and after cooking, and in eating quality.

RESULTS

i) Visual Appraisal

Results indicated that uncooked chickens from the group fed on the 25% maize ration were preferred to all others including the white chickens. None of the preference differences from these panel tests were statistically significant at any acceptable level. The results, however, produced slightly higher scores for preference for the birds fed on the 25% maize ration and the lowest score for birds fed on the 70% maize ration; scores for white birds were intermediate. The means of the results for the three tests are shown in Table 7.

Table 7: Mean Scores for Acceptability of Chickens Before Cooking

	White Chicken	Wheat and Carophyll	25% maize	50% maize	70% maize
1st Assessment	3.0	3.0	3.4	2.2	1.4
2nd Assessment	2.8	3.0	3.2	2.0	2.4
3rd Assessment	3.0	3.0	3.6	2.4	2.0

Since the preference for moderately yellow over white chickens conflicts with the results of the consumer surveys a possible explanation is that with four yellow and only one white bird to choose from panellists were biased in favour of some yellow colour.

The panel were invited to write comments about the birds and described the 70% maize fed bird as being 'far too yellow', 'colour extremely off-putting', 'too dark', 'has an 'off' look', etc.

After cooking the 70% maize fed bird was liked slightly more than the others, but no clear preference emerges.

Table 8: Mean Scores for Acceptability of Chicken After Cooking

	White Chicken	Wheat and Carophyll	25% maize	50% maize	70% maize
1st Assessment	2.4	3.0	3.4	3.4	3.6
2nd Assessment	2.6	3.2	3.2	3.4	4.0
3rd Assessment	3.6	4.0	4.2	3.8	4.0

ii) Taste Tests

No statistically significant difference in flavour between the groups of chickens was detected by the panel. Mean scores for the three tests are shown below.

Table 9: Mean Scores Given for Flavour of Chickens Fed on the Different Diets

	White Chicken	Wheat and Carophyll	25% maize	50% maize	70% maize
Panel Test 1	3.8	3.8	3.0	3.4	4.2
Panel Test 2	2.4	4.2	3.8	3.8	3.8
Panel Test 3	3.6	3.8	4.0	4.4	3.8

The members of the panel, in their comments written after scoring the samples for flavour, consistently agreed on the tenderness of the chickens, which is to be expected. They also tended to agree on the juiciness of the meat although their reactions differed. For example, the white bird in Panel Test 1 was described as 'watery' by one panellist, 'soggy' by another and 'juicy' by a third. Similarly the wheat and carophyll sample in Panel Test 3

was variously described as being 'soggy', 'juicy' and of 'nice texture'.

iii) Consumer Surveys

a) The Sample

Of the 1,540 housewives interviewed, over 93% bought chicken at least once a year and most of these bought frozen chickens in supermarkets. The figures in Tables 10 and 11 agree closely with those published by the British Poultry Meat Association Ltd[12].

Table 10: Frequency in Buying Chicken

	Number	%
do not buy chicken	102	6.6
buy once a week	340	22.1
buy once every two weeks	325	21.1
buy monthly	425	26.1
buy less than monthly	277	18.0
other	94	6.1

Table 11: Kind of Chicken Bought and Outlet

	No.	%		No.	%
Fresh prepacked roasting	228	15.8	Supermarket	710	49.3
Frozen prepacked roasting	707	49.1	Butcher	465	32.3
Fresh roasting not prepacked	344	23.9	Market Stall	104	7.2
Boiling fowl	67	4.6	Fishmongers/ Poulterer	48	3.3
Pieces	63	4.3	Other (farms, freezer centres, etc.)	111	7.7
Other (cooked, etc.)	29	2.0			

Classification into social grades resulted in slightly lower figures for the AB group and higher figures for the D and E groups than obtained by the National Readership Survey[11] whose classi-

fication system was used.

Table 12: Social Grade

	Number	%	NRS %
AB	108	7.0	11.7
C_1	265	17.2	22.3
C_2	354	23.0	31.3
D	398	25.8	34.5
E	399	25.9	

People over the age of 21 in the UK constituted approximately 64% (or just under 37 million) of the total population in the 1966 Census[13]. These fall into age ranges as given below. Ages of respondents sampled during the survey represented these groups closely with the exception of the 61+ age group, which is slightly over-represented.

Table 13: Ages of Respondents

Age	% of Total Population over 21 in 1966 Census	% of Sample in Chicken Survey
21-30	18.4	16.4
31-40	17.6	17.1
41-50	18.9	18.6
51-60	18.9	17.1
61 and over	26.3	30.3

0.5% of the sample were under 21.

Cross-tabulations of age against household size show that the majority of single people and families of two fall into the 61+ age group with, as would be expected, the larger families belonging to

respondents in their 30s and 40s (Table 14). There is very little difference in the pattern of chicken buying between age groups and social grades (Tables 15-20). A slight tendency for older housewives to buy boiling fowl and to use butchers' shops, market stalls and fishmonger/poulterers can be seen, while housewives in the higher income brackets are more inclined to bulk-buy for their freezers.

Table 14: Household Size and Age of Respondents

Household Size	Age 21-30	31-40	41-50	51-60	61 and over
1	3	0.5	2.1	10.4	29.6
2	14.9	7.2	18.8	44.2	52.1
3	27.4	11.5	20.1	22.7	14.6
4	32.3	33.2	23.4	13.7	1.3
more than 4	21.9	46.6	35.6	9.0	2.4

Table 15: Frequency of Buying and Age of Respondent

Column Percentage	Under 30	31-40	41-50	51-60	Over 60
Never	5.1	1.5	4.5	6.5	11.8
Once a week	24.1	26.2	26.5	23.6	14.8
Fortnightly	24.5	23.2	22.3	22.4	16.7
Monthly	22.9	31.2	24.0	23.5	26.8
Less than monthly	16.6	13.3	16.7	18.6	21.7
Other	6.7	4.6	5.9	3.4	8.2

Table 16: Kind of Chicken Bought and Age of Respondent

Column Percentage	Under 30	31-40	41-50	51-60	Over 60
None	5.1	1.5	4.5	6.5	11.8
Fresh prepacked roasting	12.3	11.4	13.9	16.7	17.8
Frozen prepacked roasting	58.9	63.1	47.7	43.0	29.2
Fresh not prepacked roasting	18.6	17.1	23.0	25.5	25.1
Boiling	0.8	3.0	5.6	3.8	6.7
Pieces	3.2	1.5	3.5	2.3	7.5
Other	1.2	2.3	1.7	2.3	1.9

Table 17: Outlet and Age of Respondent

Column Percentage	Under 30	31-40	41-50	51-60	Over 60
Nowhere	5.1	1.5	4.5	6.5	11.8
Supermarket	52.6	57.0	46.3	44.9	36.5
Butcher	26.1	28.1	32.4	30.8	32.2
Market Stall	5.1	4.6	8.0	6.8	7.9
Fishmonger	2.4	1.5	1.4	3.4	5.4
Other	8.7	7.2	7.3	7.6	6.2

Table 18: Frequency of Chicken Buying and Social Group

Column Percentage	AB	C_1	C_2	D	E
Never	0.9	2.3	7.1	3.8	13.0
Once a week	19.4	20.8	20.9	30.9	16.3
Fortnightly	24.1	23.4	25.7	18.8	16.8
Monthly	30.6	26.8	26.8	25.6	23.8
Less than monthly	20.4	21.1	15.5	14.1	21.8
Other	4.6	5.7	4.0	6.8	8.3

Table 19: Kind of Chicken Bought and Social Group

Column Percentage	AB	C_1	C_2	D	E
None	0.9	2.3	7.1	3.8	13.0
Fresh prepacked roasting	16.7	13.6	13.6	14.6	16.0
Frozen prepacked roasting	49.1	50.6	50.6	53.8	30.3
Fresh roasting not prepacked	23.1	25.7	21.5	20.9	22.3
Boiling	4.6	4.2	3.4	2.8	7.0
Pieces	3.7	2.6	2.0	2.5	8.8
Other	1.9	1.1	2.0	1.8	2.5

Table 20: Outlet and Social Group

Column Percentage	AB	C_1	C_2	D	E
Nowhere	0.9	2.3	7.1	3.8	13.0
Supermarket	43.5	54.7	47.7	51.8	34.6
Butcher	32.4	29.1	26.3	30.4	33.6
Market Stall	5.6	5.3	9.3	4.0	8.5
Fishmonger	4.6	1.9	3.4	1.8	4.8
Other	13.0	6.8	6.2	8.3	5.5

b) Preferences

Over 80% of all the people interviewed would rather buy the white chicken than the yellow. There is a slight regional difference in the degree of preference (see Table 21), for example, in Newcastle and Reading the number of respondents preferring white was under 80% while in Manchester and Derby it was nearly 90%. The much smaller samples taken in Leeds, Derby and Reading should be borne in mind. In Newcastle and Manchester response to fresh and frozen birds was similar.

The reasons given for preference fall into a fairly small number of categories, the most popular one being that white chicken is fresher than yellow. It was often difficult for interviewers to extract a reason for preference, and a large number of

Table 21: Preference for White and Yellow Chickens %

(a) Frozen Chickens

	Newcastle	Manchester	Leeds	Derby	Reading	All Data
White	75.2	90.0	83.5	87.7	71.4	81.5
Yellow	24.8	10.0	16.5	12.3	28.6	18.4

(b) Fresh Chickens

	Newcastle	Manchester	Newcastle knowing cause of yellowness
White	86.0	87.6	77.7
Yellow	14.0	12.4	22.3

(c) Fresh and Frozen - All Data

White	82.7
Yellow	17.3

respondents could only say that they 'just liked' or disliked a chicken for no explicable reason. Table 22 gives the mean percentage for all data of respondents giving reasons for preference.

Table 22: Reasons for Preference of Chickens

Reasons for Preference %	All Data
No answer	3.8
Likes yellow no particular reason	2.8
Yellow are free range, etc.	5.6
Yellow are richer, etc.	5.1
Other	3.0
Likes white no reason	33.2
White fresher	23.4
White more tender	4.9
Used to white	6.2
Other	12.0
	100.0

Reasons for Dislike %	All Data
No answer	6.9
Dislike yellow no particular reason	30.4
Yellow too fatty	9.8
Not used to yellow	6.1
Yellow stale	12.0
Yellow older	13.9
Other	6.8
Dislike white no reason	4.0
White poor eating quality	3.8
Other	6.4
	100.0

White chickens are thought to be fresher than yellow ones, younger and more tender. These findings agree with the conclusions reached after the group and individual interviews. Of those choosing the yellow chicken, most seem to associate with the colour various qualities such as richness, free range production, extra healthiness and naturalness. Those disliking yellow see them as being aged, stale or undesirably fat. Because of the possibility of older people choosing yellow chickens since they associated them with pre-broiler days, the effect of age of respondent on choice was examined. Table 23 shows that of the 466 people interviewed in the 61+ age group, 101 or 21.7% chose yellow. It, therefore, appears that there is a slight age effect on preference for yellow chickens.

Table 23: Effect of Age of Respondent on Preference

Choice		Under 21	21-30	31-40	41-50	51-60	61+	Row Total
Yellow	no.	2	36	30	52	45	101	266
	%	25	14.2	11.4	18.1	17.1	21.7	17.3
White	no.	6	217	233	235	218	365	1274
	%	75	85.8	88.6	81.9	82.9	78.3	82.7

Age and socio-economic group had little influence on the reasons given for choice. Tables illustrating this can be seen in Appendix III.

It is difficult to estimate the strength of a dislike or preference. Table 24 shows one method of approach to the problem. Figures for total data are given, and these represent the general trend in all the surveys.

Table 24: Opinion about Appearance of Yellow and White Chickens % of Total Sample

	Appearance of Yellow Chicken	Appearance of White Chicken
No answer	0.6	0.4
Very good	8.9	24.3
Good	18.4	35.4
Average	29.5	34.4
Fairly poor	16.9	3.5
Poor	25.7	2.0

The implication of this classification is that white chicken is much more strongly liked than yellow. Only about 5% of people put it into the 'poor' categories compared with over 40% for the yellow one. Since the chickens were alike in all respects but colour this gives some idea of feelings on the matter. If the survey towns are looked at separately (Table 25) some variation occurs, respondents in Newcastle and Reading liking the yellow one slightly more than respondents in the other three towns. Sample size must here be taken into consideration.

In a further attempt to find out the strength of the preference for white chickens, respondents were asked whether they would buy the yellow chicken if it was cheaper than the white one. The answer was heavily in favour of the white chicken, over 75% of respondents saying that they would not buy the yellow one

Table 25: Opinion about Appearance of Yellow and White Chickens in the Five Survey Towns

Appearance of Yellow Chickens

Town	Newcastle	Manchester	Leeds	Derby	Reading
No. of Respondents	702	537	97	106	98
	%	%	%	%	%
No answer	0.5	0.4	0	0.9	3.1
Very good	12.7	6.6	6.2	1.9	4.1
Good	24.4	13.3	10.3	7.5	20.4
Average	35.1	23.6	23.6	23.6	43.9
Fairly poor	16.2	15.2	25.8	21.7	14.3
Poor	11.1	40.9	34.0	44.3	14.3

Appearance of White Chickens

Town	Newcastle	Manchester	Leeds	Derby	Reading
No. of Respondents	702	537	97	106	98
	%	%	%	%	%
No answer	0.5	0.2	0	0	2.0
Very good	22.8	33.1	10.3	10.4	4.1
Good	35.8	36.8	41.2	23.6	24.5
Average	35.7	25.7	46.4	51.9	54.1
Fairly poor	3.6	1.5	2.0	11.3	11.2
Poor	1.6	2.7	0	2.8	4.1

even if it cost less than the white. (Table 26)

Table 26: Respondents Willing to Buy Chicken if it was Cheaper %

Yes	23.6
No	76.0
No answer	0.4

Of those answering that they would buy, the greatest number required a considerable price reduction before doing so.

Table 27: Price Reduction Needed

	% of those willing to buy at lower price
Less than 2.5p/lb	32.3
2.5p/lb	29.3
5p/lb	38.4

Over half the people in the survey in which the cause of yellowness was given were able to name the maize sample, and the numbers giving the various names are shown in Table 28. Strictly speaking, pigeon corn and hen corn are inaccurate but were accepted for the purpose of this survey since they are, or were maize-containing feeds.

Table 28: Recognition of Maize

% Correct Answers 55		% Incorrect Answers 15.8		% 'Don't Know' 29.1
Composition: no. of respondents		Composition: no. of respondents		No. of respondents
Corn	69	Split peas	33	81
maize	46	lentils	7	
Indian corn	12	soya	1	
hencorn/chicken food	9	wheat	1	
sweetcorn	6	pomegranate seeds	1	
pigeon corn	6	dried chicken	1	
corn on the cob	5			
Total	153	Total	44	Total 81

Knowledge of the cause of yellowness did not seem to have much effect on preference. Although the percentage choosing yellow is, at 22%, higher than the 17.3% figure for total data it is not as high as the percentage preferring yellow in the Newcastle and Reading frozen chicken surveys (see Table 21). It is possible

that the Newcastle frozen chicken survey is not typical for some reason and the small sample size in Reading may account for some of the difference. Having been told the cause of yellowness respondents still gave staleness as an important reason for not

Table 29: Reasons for Preference of Chickens

Reasons for Preference %

	Newcastle Fresh Chicken	Newcastle Fresh Chicken knowing cause of yellowness
No answer	1.1	0.4
Likes yellow no particular reason	1.7	3.2
Yellow are free range, etc.	2.8	5.8
Yellow are richer, etc.	5.6	10.1
Other	4.5	2.5
Likes white no reason	39.9	46.4
White fresher	20.2	12.9
White more tender	2.8	2.2
Used to white	9.6	6.8
Other	11.8	9.9

Reasons for Dislike %

	Newcastle Fresh Chicken	Newcastle Fresh Chicken knowing cause of yellowness
No answer	5.6	6.5
Dislike yellow no particular reason	37.1	38.1
Yellow too fatty	8.4	7.8
Not used to yellow	8.4	5.8
Yellow stale	16.8	12.2
Yellow older	5.1	5.8
Other	6.2	5.8
Dislike white no reason	1.7	6.5
White poor eating quality	4.5	4.7
Other	6.2	6.8

choosing the yellow chicken. If the survey on fresh chicken in Newcastle not knowing the cause of yellowness is compared with the survey in which the cause of yellowness was known, the numbers giving freshness as a reason for preferring white are almost halved. On the preference side those thinking it was richer, more nourishing, etc., went up slightly.

iv) Household Tests

Over 60% of respondents preferred the appearance of the white chicken before cooking, 28% preferred the yellow and 11% had no preference at all. After cooking the numbers evened out considerably, suggesting that there was very little to choose between them, nearly 30% preferred the appearance of the white chicken, just over 40% preferred the appearance of the yellow one and nearly 30% had no preference at all.

In the eating test overall liking was slightly in favour of the yellow chicken for flavour, juiciness and overall enjoyment. In all cases 30-40% of respondents could not detect any differences between them. Table 30 shows total results. Not all the

Table 30: Visual Appraisal and Eating Preference in Individual Homes

Number of Households involved 57

Number of Questionnaires returned 116

Preference for:	Yellow Chicken		White Chicken		No Preference	
	No.	%	No.	%	No.	%
1. Appearance uncooked	31	28.4	70	60.3	13	11.2
2. Appearance after cooking	50	43.1	34	29.3	32	27.5
3. Tasting:						
Overall preference	48	41.3	36	31.0	32	27.5
Most tender	33	28.4	33	28.4	50	43.1
Juiciest	52	44.8	31	26.7	33	28.4
Best flavour	46	39.6	30	25.8	40	34.4

questionnaires were returned. Participation of other members of the household was encouraged.

Participants were asked to give their reasons for choosing the yellow or white chicken before and after cooking and to comment on them after tasting.

Before Cooking

Respondents were asked whether size, shape, colour or general appearance were important in influencing their choice and if so, which was the most important and which next most important (see Table 31).

Table 31: Reasons for Choosing Uncooked Chicken

	Respondents preferring yellow		Respondents preferring white	
Most important reasons	No.	% of total preferring yellow	No.	% of total preferring yellow
Size	6	15.7	4	6.0
Shape	4	10.5	1	1.5
Colour	9	23.6	25	37.9
General Appearance	19	50	36	54.5
Next most important reason				
Size	6	15.1	9	13.6
Shape	14	36.8	10	15.1
Colour	9	23.6	28	42.4
General Appearance	9	23.6	19	28.7

Of those choosing yellow only 24% gave colour as the most important reason for choice compared with 38% of those choosing white. More than 25% of people who preferred yellow gave reasons of size and shape compared with 7.5% of those preferring white.

Approximately the same proportion of both were influenced by the general appearance. This suggests that those who chose the yellow bird did so not because they preferred the colour but because they thought it was the better bird in shape and size, whereas those who chose the white chicken were far more influenced by the colour than by other qualities. (As has been mentioned, the half-chickens were of equal weight and similar in all respects but skin colour.)

After Cooking

Only about half the participants gave reasons for preference after cooking and these reasons can be put into eight categories as shown in Table 32. They corroborate the figures given in Table 31. It seems that there was really very little difference in appearance between the two half chickens after cooking.

Table 32: Reasons for Preferring Cooked Half Chickens

Reasons	Respondents preferring yellow	Respondents preferring white
	No.	No.
Better colour	10	5
Better shape	6	4
Lighter colour	2	5
More golden	2	0
Smoother browning	3	3
Skin looked crisper	1	1
Looked tastier, more appetising	7	3
Did not shrink so much	3	0

Comments after Tasting

An interesting variety of comments were given after tasting. These can be divided into three categories - those which said there was no difference in flavour, and found both chickens equally

acceptable or unacceptable, those which said the yellow chicken was tastier and those which found the white chicken preferable. Opinions tended to be contradictory. Both chickens were criticised or praised for their texture, tenderness, flavour, appearance, juiciness and carving qualities.

Although there is no difference in flavour between the yellow and white chickens, there is a strong preference for the white ones. Comments written during the household test confirm the reasons given for suspicion of the yellow chickens in the interviews and surveys.

It is apparent that people entertain distinct doubts about the quality and desirability of yellow chickens, and that they are not a commercial proposition unless they are made to appear attractive in some way. The idea, put forward by housewives in the group and individual interviews, that telling consumers the cause of yellowness would remove their prejudices and help to change attitudes was not substantiated. Whether the prejudice was overcome or not in the survey, people still chose the chicken with which they were familiar.

Chapter III

SHOP TESTS

The final stage in the investigation was a series of supermarket shop tests held in the Newcastle area. Although results from the consumer attitude studies and product tests indicated that the yellow chickens were quite strongly disliked under the conditions of the work described it was necessary to see whether consumers reacted in the same way when given the opportunity to choose for themselves in the shops. If they did react in the same way, it would be unlikely that yellow chickens would account for more than 20% at the most of weekly chicken sales where a choice between white and pigmented chickens was available. In the selected supermarkets, therefore, customers were given a choice between white and pigmented chickens and the numbers of each purchased each week during the period of the shop tests were compared. Frozen chickens were used because of the practical problems involved in the marketing of fresh chickens.

In order to avoid complication by other factors as much as possible it was necessary to offer the same weight range in both white and yellow birds so that choice should not be made on a weight basis, to ensure that equal numbers of both types were available and visible, and to present the yellow birds in a package which would not compare unfavourably with that in which the white birds were sold.

Choice of Shop

Generous co-operation was given by a firm operating a local chain of supermarkets on Tyneside. Four of their shops were chosen. These were selected partly for size; all four were fairly large by Tyneside standards, with a good total chicken turnover, partly on the basis of position so that a wide cross-section of the

population could reasonably be expected to use them, and partly for their distance apart since each had to be visited several times a day for checking. Two of the stores were located in Newcastle upon Tyne. NE was the largest of the four, in a working class area in the process of redevelopment, close to the city centre with good car parking. XD was in a neighbourhood shopping centre in a pleasant suburban area. By observation its clientele was a mixture of socio-economic groups. QD was a new shop on the main street of a mining village, and NL was on the main street in the centre of a small market town.

Size of Chickens and Number Required

Because the aim was that customers should choose chickens as far as possible on the basis only of colour, it was important to sell the same sizes in pigmented birds as the brand usually sold by this supermarket firm. These sizes were 2lb 6oz, 3lb 4oz, 3lb 10oz, 4lb 0oz, 4lb 2oz. Consultation with the chicken buyer gave the necessary information for planning probable numbers needed per week.

During the consumer surveys 26% of respondents said that they usually bought chickens once a month, 21% that they bought chicken once a fortnight and 22% that they bought weekly (p. 22). For this reason the shop test was scheduled to run for twelve weeks, in order to allow ample time for repeat purchasing.

Production of Chickens

Having decided upon the size and probable number of chickens required it was possible to plan their production.

The time taken for chickens to reach slaughter weight can be predicted with a degree of precision which cannot be applied to the production of most other livestock, and it is because of this that poultry packing stations are able to plan to run at full

capacity in co-operation with growers and hatcheries. However, the birds do not grow at exactly the same rate and a range of packed weights from 2 to 5 lbs usually occurs when the chickens are killed at around 60 days, the majority falling into the 3-4 lb range for which there is more demand. As might be expected, birds of the same sex tend to grow more evenly than a mixed group and male birds reach slaughter weight rather more quickly than females.

Allowance was made for these factors when deciding on the total number of birds needed, but even though 6,000 chickens were produced, the largest size was used up in the tenth week of the shop test and arrangements had to be made to use 3lb 12oz birds instead. No sex difference in colour having been established it was decided to buy male day-old chicks, resulting in a shorter production time and a smaller range of weights after packing.

On the basis of the trials at the University Experimental Farm described in Chapter I, and the product tests described in Chapter II, it was thought that a 25% level of inclusion of whole maize in the diet would produce satisfactory pigmentation.

A grower was contacted and agreed to produce 6,000 chickens and the representative of a large feed manufacturing firm to whom the matter was explained undertook to supply a balanced ration incorporating 25% of whole maize. The chickens were slaughtered, processed and packed by a well known processor, and were then transferred to a public cold store in Newcastle ready for weekly withdrawal to the shops.

Packaging

The majority of poultry and all frozen chickens are sold in individual packages. The objectives of this kind of packaging are simple and practical. The product has to be protected from contamination, physical damage and chemical spoilage and it has to be presented in a form which is acceptable to the consumer and convenient to handle.

Since most chickens are sold in self service supermarkets the package can also be used in a promotional capacity. It needs to describe the product's features and make a favourable overall impression. Most chickens are sold under brand names with the intention of associating these names with distinctive characteristics such as freshness and reliability. However, the response of housewives described in Chapter II suggested that consumers are not particularly brand-conscious with respect to chickens. The British Poultry Meat Association's promotion of chickens on a non-brand basis with their advertising campaign 'Buy a British Chicken' and 'Pick up a chicken this weekend' also suggests recognition of low brand-awareness.

It has already been said that in offering consumers a choice between the two types of chicken other influencing factors had to be considered. The chickens normally sold in these supermarkets were packed in clear, gussetted polythene bags with the brand name 'Countrystile' and a design in red and blue on the front, plus the weight and price. Clear gussetted polythene bags were, therefore, chosen for the yellow chickens; the product would be easily visible. Absence of a design and brand name being like to influence customers in their choice, it was necessary to provide both. For economic reasons it was not possible to test a design and the one supplied by the Design Department of the polythene bag manufacturer was accepted.

Naming the Product

Although it has been suggested that the brand naming of chickens is not as important for their success as the appropriate naming of other products, it was nevertheless essential that a suitable name should be chosen.

Many brand names are chosen for their similarity to existing brands, and Peterson and Ross[14] found that consumers possessed

preconceived notions that certain words or word sounds reminded them of certain specific products, concluding that good marketing strategy would involve choosing new brand names which possessed some similarity with existing ones.

Brand names can also be made to describe the properties of the commodity directly creating expectations in the mind of the consumer which it is hoped will cause him or her to purchase the produce.

Bearing the above considerations in mind, and the reasons for liking or disliking the yellow chickens discovered in the consumer attitude and survey work, a list of 22 possible names was chosen from an original list of more than forty.

This list is as follows:

Sunroast	Goldies
Golden Farm House	Sunny Vale
Goldencrown	Buttercup
Goldchick	Goldenray
Golden Vale	Tastichick
Golden Harvest	Tender 'n' Golden
Frozen Gold	King Charles Chickens
Countrygold	Golden Valley
Farmgold	Sunray
Harvestgold	Sunfield
Goldfarm	Farmhouse Gold

It was shown to 15 members of the Agricultural Department and each person was asked to choose the five names which they considered most appropriate to the product. The five most liked names were Sunroast, Tastichick, Tender 'n' Golden, Countrygold and Farmgold. These names were then written on separate cards and 10 more individuals who did not know the purpose of the names were shown the cards in turn. They were asked to say what associations the words evoked, since it is essential to avoid names which have bad associations. Of the five, Countrygold, Farmgold and Tender 'n' Golden aroused the most favourable expectations. A street survey was then carried out with these three names in which members of the public were asked which name they thought would best describe the

product. Out of 170 people, 82 preferred Tender 'n' Golden, 58 preferred Countrygold, and 30 Farmgold. It was therefore decided to name the yellow chickens Tender 'n' Golden, a name which incorporated both the notions of youth and succulence with the attractive idea of golden-ness.

Pricing

As presentation and choice of brand names influence the sale of a product, so does pricing. In recent years there has been a growing awareness of the complex role of price as a determinant of a purchase decision. There appear to be two main factors. The first is the price-consciousness of the consumer, and the second is the extent to which price is seen as a measure or indication of quality.

Gabor and Grainger[15] suggest that price consciousness varies over products. There is reason to suppose that in the case of chickens there is a fairly high level of price consciousness, illustrated by the response to 'offers' of cheaper chickens in the shop tests.

If buyers were aware of the quality of alternative product offerings they could, therefore, be expected to buy the cheaper offering of two of the same quality. In practice, however, the buyer rarely has complete information about the quality of alternatives. In these circumstances he may use price as an indicator of quality and, therefore, prefer the higher priced of two alternative products. The question of whether price is in fact used as a measure of quality has been investigated by several workers[16] [17], who have shown that when subjects were given a choice between pairs of products whose only difference lay in their price, the higher priced articles were more often preferred.

It was therefore decided that, since the white and pigmented chickens were to be displayed side by side and that, in any event at first, customers would have no experience of the quality to be

expected from the yellow chickens the price of the latter would be set at 1p/1b higher than that of the white chickens in order to suggest quality. This was done at first in all the shops, but it was abandoned in NE after six weeks because of the policy of using chickens as attractive low price 'offers' made the price differential too great, and in NL at the same time because of poor chicken sales generally.

In the first shop test advertising was minimal.

The Shop Test

Once the chickens had been produced and packed, and were available in the public cold store for regular weekly supply, the shop test was begun. It ran from 13th April, 1972 to 1st July, 1972.

Deliveries of chickens were made every Tuesday and a week's supply for each shop was kept in the stock-room deep freeze ready to replenish the display cabinet. A researcher was employed to travel round the shops on the days of highest chicken purchase (Thursday, Friday and Saturday) to keep the displays even by topping up from stocks in the stock-room deep freeze. The researcher also checked price labels and recorded sales from deliveries to the stores and remaining stock at the end of the week. At least three visits were paid to each shop on these three days. During the third week of the test NE and XD sold 2lb 6oz birds as a special offer (NE repeated this offer in the seventh week) and in week 9 all the shops were selling boiling fowl or 'steam roasters' at a low price. Sales in NL were affected by painting and decorating in the refrigerator area in the sixth week. The refrigerator in this shop was of the old fashioned, high sided type, very difficult to see into and awkward to arrange an even display in. Because of dwindling sales in NE and NL, the prices of the yellow birds were adjusted at the end of the sixth week to be the same as those of the white ones. The weight range of

chickens produced extended from 21b 2oz to 51b although the majority were between 31b and 41b.

Although the first batch of chickens were slightly pigmented and could be distinguished from conventionally fed chickens, they did not reach the level of pigmentation expected from the results of the small scale trials carried out at the University farm. This was presumably due to a low pigment maize having been used. It was felt that the shop test should be repeated using a more strongly pigmented bird, and that this would also give the opportunity of examining the effect of using more promotional material than in the first test.

Because of the difficulties encountered in shops NE and NL (frequent special offers in NE and unsatisfactory refrigerator accommodation in NL) it was decided to use shops XD and QD only. For economic reasons the chickens were produced at the University farm where limitations of housing permitted only 2,000 birds to be produced. The second shop test ran for six weeks from November 9th, 1972 to 16th December 1972 partly because of the smaller number of chickens produced and partly in order to complete the test before Christmas buying affected chicken sales. This period still allowed time for repeat buying.

Production of Chickens

To ensure a level of pigmentation which would provide a better contrast with the non-maize fed birds those for the second test were fed on a diet containing 50% of maize.

Feed was specially mixed by a local firm and the chickens were processed and packed by a small packing station. They were then transferred to the public cold store in Newcastle ready for withdrawal as before.

The degree of pigmentation in this second batch was extremely satisfactory and a distinct difference could easily be seen between

maize fed and non-maize fed birds in the shops.

The same packaging was used as in the first test but it was decided to charge the same price for white and yellow birds.

Advertising Material

An advertising agency was consulted in order to provide some promotional material. The agency was given access to the consumer attitude work and the resulting message was intended to counter negative attitudes revealed towards the yellow chickens, i.e. that they were old, stale or tough, and to reinforce the idea that they were wholesome and natural.

This resulted in the production of coloured posters and leaflets. The posters, measuring 20" x 15" bore the message:

"It's new!
This time try a 'Golden' chicken
Naturally fed, naturally better"

These were displayed prominently in the areas of the cold cabinets. The leaflets read as follows:

This time try a 'GOLDEN' CHICKEN
naturally fed, naturally better.
Here's chicken the way it used to be -
young, succulent, tastier. This time,
try a 'Tender 'n' Golden roasting
chicken - and see what you've been
missing all these years.

Eleven thousand of these leaflets were distributed to households in the neighbourhood of the two test shops. XD received 1,000 and QD 3,000 leaflets for in-store use and distributed them to customers at the check-out. Posters and leaflets showed an appetising roasted chicken set out on a platter and surrounded by trimmings.

Although this advertising was carried out on a limited budget

it was quite intensive in the areas concerned. Resources were unfortunately not available for an advertising recall study, in which a sample of households would have been interviewed before and after the advertising to find out whether they had been aware of it, and to attempt to see whether attitudes had been shifted at all.

In other respects the second shop test was carried out in the same way as the previous test.

Findings

The number of chickens sold in each shop in the first test is shown in Table 33, and the percentage which each of these figures represents of total weekly sales is given in Table 34.

Table 33: Chickens Sold 13th April-1st July, 1972

Shop	NE		XD		QD		NL	
Week No.	Country Stile	Tender 'n' Golden	Country Stile	Tender 'n' Golden	Country Stile	Tender 'n' Golden	Country Stile	Tender 'n' Golden
1	208	36	92	34	139	33	138	25
2	65	39	80	32	99	29	39	21
3	292	27	221	39	130	31	55	27
4	378	31	165	65	102	47	98	26
5	231	11	152	49	71	35	94	25
6	166	12	130	55	63	43	46	14
7	243	49	132	62	141	52	131	20
8	307	32	58	41	118	31	108	25
9	279	39	71	65	140	49	47	3
10	165	51	81	60	196	29	86	12
11	190	27	58	40	150	44	63	15
12	169	40	69	44	120	26	42	18

Table 34: Percentage of Total Sales

Shop	NE		XD		QD		NL	
Week No.	Country Stile	Tender 'n' Golden	Country Stile	Tender 'n' Golden	Country Stile	Tender 'n' Golden	Country Stile	Tender 'n' Golden
1	85.2	14.7	73.0	27.0	80.8	19.2	84.7	15.7
2	62.5	37.5	71.4	28.5	71.7	28.3	65.0	35.0
3	91.5	8.5	85.0	15.0	80.7	19.3	67.0	33.0
4	92.4	7.5	71.7	28.3	68.5	31.5	79.1	20.9
5	95.4	4.6	75.6	24.4	66.9	33.1	78.9	21.1
6	93.3	6.7	70.2	29.8	59.4	40.5	76.7	23.3
7	83.2	16.8	68.0	32.0	73.0	27.0	86.8	13.2
8	90.6	9.4	58.6	41.4	79.2	20.8	81.2	18.8
9	87.7	12.3	52.2	47.8	74.1	25.9	94.0	6.0
10	76.4	23.6	57.4	42.6	87.2	12.8	87.8	12.2
11	87.5	12.4	59.2	40.8	77.3	22.7	80.8	19.2
12	80.9	19.1	61.0	39.0	82.2	17.8	70.0	30.0
		14.4		33.05		24.9		20.7

Size of shop and chicken turnover is reflected in these figures.

Figures for number of chickens sold in the second shop test are given in Table 35, and percentages of total sales in Table 36.

Table 35: Chickens Sold 9th November-16th December, 1972

Shop	XD		QD	
Week No.	Country Stile	Tender 'n' Golden	Country Stile	Tender 'n' Golden
1	76	40	77	22
2	86	42	32	26
3	89	48	97	37
4	90	45	91	45
5	74	31	52	30
6	74	39	62	41

Table 36: Percentage of Total Sales

Shop	XD		QD	
Week No.	Country Stile	Tender 'n' Golden	Country Stile	Tender 'n' Golden
1	65.5	34.5	77.8	22.2
2	67.2	32.8	55.2	44.8
3	64.0	36.0	72.4	27.6
4	66.6	33.4	66.9	30.1
5	70.5	29.5	63.4	36.6
6	65.5	34.5	60.2	39.8
		33.5		33.5

The computer was used in the analysis of results.

The analysis of chicken sales was foreseen initially as an analysis of covariance. The dependent variable, CENTGOLD, was percentage of chickens sold which were yellow* (see Tables 34 and 36). Variables which seemed likely to influence, or be associated with changes in percentage of yellow chickens sold were:

1. Time (number of weeks experiment had run)
2. Shop
3. Advertising (no advertising, standard advertising or special advertising in the second experimental period)
4. Expenditure period (the first shop test was in summer when customers were more likely to be buying and therefore comparing chicken types)
5. Price differences between white and yellow chickens
6. Extent of special offers for white chickens

---

* Because the percentages were fairly widely spread no attempt was made to normalise the dependent variable.

These variables are listed as VAR03 to VAR11 on the computer output. Time was the only continuous variable, the remainder appearing as 01 or dummy variables. To allow for a non-linear relationship between sales and time an additional variable, time squared (TIMSQR) was constructed for use in the regression. Experimentation with various combinations of these variables gave the following best results judged on the basis of statistical significance and theoretical expectations.

Table 37: Dependent Variable CENTGOLD - Taken from Computer Print-out

Analysis of Variance	DF	SUM OF SQUARES	MEAN SQUARES	F
Regression	4	2823.12112	705.78028	9.240
Residual	55	4201.25406	76.38644	

VARIABLES IN THE EQUATION

VARIABLE	B	BETA	STD ERROR B	F
VAR 04 Shop XD	7.91898	0.33539	2.63995	8.998
VAR 09 Second Exp Period	12.69540	0.46933	3.83825	10.940
VAR 10 No Price Difference	-6.85001	-0.31015	3.04929	5.046
VAR 11 Special Offer	-10.79013	-0.21734	5.22735	4.261
(CONSTANT)	23.84873			

MULTIPLE R	0.63396
R SQUARE	0.40190
STANDARD ERROR	8.73993

As shown by R SQUARE 40.19% of variation in sales is explained by this model. All variables included are significant at the 51% level as indicated by F.

The results indicate that an unbiased estimate of average sales of yellow chickens would be 23.8% of total sales, although the standard error associated with this is fairly large (8.74).

Factors which affected sales were as follows:

a) Shop type. XD appeared to sell more than average.

b) Second experimental period. Sales were higher than average in this period.

c) Price difference. It seems that if there was no price difference between white and yellow chickens, sales of the yellow ones were depressed.

d) Special offers. Special offers of cheap chickens other than yellow depressed the sales of the yellow birds.

With reference to Table 37, percentages of chicken sales accounted for by yellow chickens can, therefore, be represented as follows:

% sales (yellow chickens) = 23.8 (unbiased average)
+ 7.9 if XD (2.6)
+ 12.7 in 2nd Experimental Period (3.8)
- 6.8 where no price difference (3.0)
- 10.8 when special offers available (5.2)

$$R^2 = 40.19\%$$

Figures in parentheses are standard errors.

All coefficients are significant at 95% level.

Special advertising in the second shop test appears to have had no effect. However, there is a high correlation between this variable (VAR08) and the second experimental period (VAR09) which prevents identification of their separate effect, and variable 9 was chosen because it appeared to explain slightly more variations than VAR08. It is arguable that some of the increase in sales during this period should be attributed to advertising since it is unlikely that season would influence choice among type of chicken, although it does influence total chicken consumption.

Chapter IV

SUMMARY AND CONCLUSIONS

This research examines the possibilities of marketing yellow skinned chickens in the United Kingdom where, at the present time, white skinned chickens are thought to be preferred. If a reasonable degree of acceptability could be found for chickens with yellow pigmented skin then there would be possibilities of more flexible formulation of rations using higher levels of maize than is possible in order to produce white birds. In addition, there might be possibilities of marketing yellow skinned chickens to certain market segments with advantage because of any positive associations with their yellowness.

Tests producing chickens on diets containing 25%, 50% and 70% of maize resulted in statistically significant differences in skin colour which could be clearly seen.

Consumer attitudes to chicken in general and yellow birds in particular were examined by means of group and individual interviews using unstructured questions and various projective techniques. These showed that chicken is generally regarded as an economical and nutritious meat. Some people, however, considered chicken tasteless.

Yellowness in food was regarded initially with distaste, though respondents could recall yellow food which they found attractive, such as butter, cheese, egg yolks, etc. Food, however, which is not the accustomed colour is immediately suspect and white is the colour expected in chickens, thus some thought that yellow chickens would be stale, old, dry or dyed and others that the birds would have been fed on special, by implication, unwholesome food. Whiteness is, however, associated in some minds with tastelessness, though chicken is not expected to be particularly tasty. The interviews suggested that provided the housewife was convinced that

yellow chickens were as good or better than white ones and she was reassured that the colour was perfectly wholesome, she would be willing to buy them. This was not substantiated by the results of further investigation. There were, moreover, some people who ascribed positive advantages to yellow chickens, notably that they were natural, rich and might appeal to children.

Actual acceptability of yellow skinned chickens was tested in four stages:

1) A laboratory examination using an expert panel.
2) Consumer surveys in which respondents were asked to choose between yellow chicken fed on a 25% maize diet and white chicken of normal appearance; both fresh and frozen.
3) A further consumer survey offering the same choice, but in which the cause of the yellow colour was explained was conducted in order to try to eliminate the effect on choice of negative attitudes such as suspicions of age or staleness. Three surveys were carried out in Newcastle upon Tyne and two in Manchester, with smaller samples being interviewed in Leeds, Derby and Reading using frozen birds only.
4) Visual and eating appraisals of yellow and white birds before and after cooking in consumers' homes.

With the exception in tests with cooked birds either for appearance or eating quality, there was an overwhelming preference for the white chickens. Over 80 per cent of all those interviewed preferred the white birds. Their main reasons were that these were younger and fresher. The few who preferred the yellow bird most often gave as reasons that it was natural or rich. After cooking no clear preference was apparent.

Yellow chickens were sold in two shop tests conducted in supermarkets on Tyneside, allowing an equal choice with the store's usual offering of white birds. In the first only minimal

point-of-sale advertising was used; in the second test a quite intensive advertising campaign was mounted in the neighbourhood of the shops concerned and at point-of-sale. In the first test the yellow birds were sold at a small premium and in the second test at the same price as the white chickens. The two tests together indicated that average sales of yellow chickens in all shops would be 23.8% of total sales. Nevertheless, there were indications that there might be market segments in which much higher sales could be obtained. One supermarket in a middle class area averaged sales for the yellow birds of over 33% in both tests. There was also some suggestion that the advertising campaign, even though of short duration, did have a favourable effect on sales of yellow birds.

On average the results of the consumer surveys in Newcastle which suggested that sales of yellow chickens could be expected to be about 25% of total sales were substantiated by the shop tests in the same area, when sales were slightly above 23% of total. Only in certain shops were better results achieved for the yellow birds.

It must be concluded, therefore, that without strong advertising and merchandising support yellow chickens would not achieve a greater proportion of total sales in most areas. The negative connotations of yellowness, age and staleness, would clearly have to be changed before any really successful marketing of yellow chickens could be achieved. Unless maize were to become relatively much cheaper than other cereals, it is unlikely that the poultry industry, organised as it is, and in the presence of low brand awareness among consumers would accept the necessarily heavy advertising costs. At the same time there is a clear indication from the tests that a not inconsiderable proportion of the population would be perfectly satisfied with yellow chickens. Indeed, it may well be that any store which featured yellow chickens only would, at the worst, not sell any less than stores selling

white chicken and at the best might well develop profitably demand for these chickens.

Taking into account the fact that there appears to be low brand awareness with regard to chicken among consumers, it could be argued that there may be a sufficiently large market segment, with positive preference for yellow skinned chickens, to offer any firm interested in differentiating the product in this way the chance to obtain a perfectly satisfactory brand share, possibly at a premium price. The research, however, because the shop tests were conducted in supermarkets rather than also offering the product in more specialised outlets, can only suggest this possibility. Nevertheless, since sales of yellow chickens in the shop tests represented a quite similar proportion to that of consumers who stated a preference for these birds, it would appear that selection in the shops was conscious rather than a matter of chance. In the circumstances, therefore, the potential overall market share for yellow skinned chickens might well be somewhat higher than that indicated in this work.

APPENDIX I

Rations fed to broilers during trials at Newcastle University Experimental Station, per half ton mix:-

a) No Pigment (2nd Trial only)

	cwt
Wheat	7¼
Soya bean meal	1½
Fish meal	1
Vitamins and minerals	¼

b) Wheat + Carophyll

	cwt
Wheat	7¼
Soya bean meal	1½
Fish meal	1
Vitamins and minerals	¼
"Carophyll" Yellow	60g
"Carophyll" Orange	20g

c) 25% Maize

Maize	2½
Wheat	4¾
Soya bean meal	1½
Fish meal	1
Vitamins and minerals	¼

d) 50% Maize

Maize	5
Wheat	2¼
Soya bean meal	1½
Fish meal	1
Vitamins and minerals	¼

e) 70% Maize

Maize	7
Wheat	¼
Soya bean meal	1½
Fish meal	1
Vitamins and minerals	¼

APPENDIX II

CHICKEN SUBJECTIVE EVALUATION

SCORE CARD

NAME _____

DATE _____

TIME _____

You are presented with FIVE samples of chicken.

1. Indicate the overall acceptability of each sample, ranking them in order of preference.

SAMPLES IN ORDER	Rating	1 Liked Very Little	2 Liked Little	3 Liked Moderately	4 Liked Very Much	5 Liked Extremely
_____						
_____						
_____						
_____						
_____						

2. Comment

_____

_____

_____

_____

_____

UNIVERSITY OF NEWCASTLE UPON TYNE

Department of Agricultural Marketing

Name _____

Address _____

_____

_____

Code _____

You have received two half chickens, one with a metal tag and one without a tag.

We would be grateful if you would:-

(a) Look at the two half chickens and then fill in the first questionnaire which is about their appearance.

(b) Cook the two half chickens, at the same time and by the same method.

(c) Eat some of each chicken with your meal. Then fill in the second questionnaire during or shortly after the meal.

We have enclosed two questionnaires and would be pleased if you and your husband would each fill in a separate questionnaire.

QUESTIONNAIRE NO. 1 (APPEARANCE)

Please take the two half chickens out of the packets and look at them and then fill in the questionnaire.

Do you prefer:- (Please tick in the appropriate box)

Metal tag	No tag	No preference
☐	☐	☐

If you prefer one half chicken or the other is it because of:

(a) Size of chicken
(b) Shape of chicken
(c) Colour of skin
(d) General appearance

(Please tick whichever one(s) applies)

Which of these characteristics do you consider to be:

(a) Most important _____

(b) The next most important _____

APPEARANCE AFTER COOKING

Please complete this section after cooking the two half chickens.

Do you prefer:- (Please tick in the appropriate box)

Metal tag	No tag	No preference
☐	☐	☐

Reason(s) for your choice:

QUESTIONNAIRE NO. 2

We would be grateful if you would cook the two half chickens and eat them. Do not remove the metal tag which is necessary for identification and will not affect the taste of the meat.

Please fill in the questionnaire during or shortly after the meal

(1) By which method were the half chickens cooked:

a. Fried
b. Roasted
c. Stewed/Casseroled
d. Boiled
e. Other (please state)

(Please tick)

(2) Did you prefer a particular half chicken:

Metal tag	No tag	No preference
☐	☐	☐

(3) Which half chicken was most tender:

Metal tag	No tag	No preference
☐	☐	☐

(4) Which was the juicier half chicken:

Metal tag	No tag	No preference
☐	☐	☐

(5) Which half chicken had the best flavour:

Metal tag	No tag	No preference
☐	☐	☐

(6) Any comments both favourable and unfavourable comments are useful to us and greatly appreciated:-

UNIVERSITY OF NEWCASTLE UPON TYNE
DEPARTMENT OF AGRICULTURAL MARKETING

Chicken Consumer Survey

Interviewer _____ Date _____

I am working for the University here in Newcastle. We are doing some research into meat marketing. Would you be kind enough to help by answering some questions about the chicken you buy?

1. Do you ever buy chicken? YES
   NO

   (If 'NO' omit questions 2, 3 and 4 and go on to question 5)

2. How often do you buy it?
   a) about once a week
   b) about once a fortnight
   c) about once a month
   d) less than once a month
   e) other (specify)

3. What kind of chicken do you most often buy?
   a) fresh prepacked roasting
   b) frozen prepacked roasting
   c) fresh roasting not prepacked
   d) boiling fowl
   e) pieces
   f) other

4. Where do you usually buy chicken?
   a) supermarket
   b) butcher
   c) market stall
   d) fishmonger
   e) other

5. (Show the two chickens so that both are seen properly). Please would you look at these 2 FRESH/FROZEN chickens. They are the same weight and the same price. If you were buying one, which would you choose?

6. a) Could you tell me why you prefer that one?

   b) Could you tell me why you don't like the other one?

7. Which of the following in your opinion, applies to the appearance of chicken

very good	very good
good	good
average	average
fairly poor	fairly poor
poor	poor

8. You chose ○/□ when both were the same price. Do you think you would have bought chicken (the one the subject did <u>not</u> choose), if it had been a lower price?

   YES

   No

9. (If 'YES'). Can you give me some idea how much lower the price would be before you would buy it?

   a) less than 2½p/lb

   b) 2½p/lb

   c) 5p/lb

10. a) We want the opinions of people in a variety of occupations. Do you mind telling me your husband's occupation?

b) How many adults over 16 and children under 16 are there in the family?

Adults _____ Children _____

11. Your name and address:

_____

_____

12. Finally, do you mind telling me your age?

APPENDIX III

Table 1: Reasons for Liking Chicken - Socio Economic Group

Reason	A/B	C_1	C_2	D	E
No answer	3.7	6.4	4.0	2.3	3.8
Likes yellow	1.9	2.3	3.1	2.3	3.5
Yellow, free range, etc.	9.3	5.7	2.5	5.3	7.5
Yellow, richer, etc.	6.5	1.9	4.8	4.3	7.8
Other	0.9	3.0	2.5	4.3	2.8
Likes white	34.3	37.4	31.6	34.4	30.8
White, fresher	18.5	21.9	27.1	26.9	18.3
White, more tender	6.5	4.9	6.8	2.5	5.3
Used to white	4.6	5.3	7.1	5.3	7.5
Other	13.9	11.3	10.5	12.6	12.8

Table 2: Reasons for Disliking Chicken - Socio Economic Group

Reason	A/B	C_1	C_2	D	E
No answer	10.2	7.5	6.8	4.5	7.5
Dislike yellow	28.7	26.8	31.4	33.9	29.3
Yellow too fatty	11.1	10.6	9.6	9.0	9.8
Not used to yellow	4.6	7.9	5.1	6.0	6.5
Yellow, stale	8.3	12.5	15.5	12.6	9.0
Yellow, older	13.9	16.6	15.8	12.1	11.8
Other	6.5	7.5	5.4	7.5	7.0
Dislike white	3.7	3.4	3.7	3.3	5.5
White has poor eating quality	5.6	0.8	2.5	5.3	5.0
Other	7.4	6.4	4.2	5.8	8.5

Table 3: Reasons for Liking Chicken - Age Group

Reason	Under 30	31-40	41-50	51-60	Over 60
No answer	2.8	6.8	3.5	3.4	2.8
Likes yellow	1.2	0.4	3.1	3.4	4.5
Yellow, free range, etc.	4.7	2.7	5.6	5.7	7.7
Yellow, richer, etc.	3.6	4.9	4.5	4.9	6.2
Other	3.6	2.3	4.2	2.3	2.8
Likes white	29.2	32.7	33.1	35.4	34.5
White, fresher	31.2	30.0	25.1	21.3	15.7
White, more tender	5.9	4.9	3.5	4.9	5.4
Used to white	4.7	6.1	4.9	8.0	6.9
Other	13.0	9.1	12.5	10.6	13.5

Table 4: Reasons for Disliking Chicken - Age Group

Reason	Under 30	31-40	41-50	51-60	Over 60
No answer	6.7	8.4	4.9	6.1	7.3
Dislike yellow	30.4	28.5	32.1	30.8	30.3
Yellow too fatty	7.5	8.0	10.8	12.2	10.3
Not used to yellow	6.7	7.2	4.9	5.3	6.2
Yellow, stale	16.6	16.7	14.3	8.4	7.7
Yellow, older	12.6	16.7	10.5	17.1	13.3
Other	7.9	5.3	7.3	6.8	6.7
Dislike white	2.4	1.5	4.2	4.9	5.6
White has poor eating quality	2.8	4.6	3.5	3.0	4.5
Other	6.3	3.0	7.7	5.3	8.2

BIBLIOGRAPHY

1. How to Evaluate Broiler Pigmentation. Roche Products Ltd. March 1968.
2. Measurement of Paint Opacities. B.S.S. 2525-32.
3. Consumers' Image of Broilers. Texas Agricultural Experimental Station, 1962.
4. Chicken Survey 1960. Notley Advertising Ltd., Oct. 1960.
5. Depth Interviews and Group Discussions. S.C.P.R. Technical Manual No. 4, 1972.
6. Carpenter, E.M., Lesser, D. & Prescott, J.H.D. Butchers' Meat and Customers' Opinions in Five Towns. Univ. Newcastle upon Tyne, Dept. Agricultural Marketing, Report No. 15, 1972.
7. Kramer, A., Murphy, E.F., Briant, A.M., Wang, M. & Kirkpatrick, M.E. Studies in Taste Panel Methodology. *J. Agric. & Food Chem.* 9: p. 224, 1961.
8. Household Food Consumption and Expenditure. Annual Report of the National Food Survey. Min. of Agriculture, Fisheries and Food, 1969.
9. Yates, F. Sampling Methods for Censuses and Surveys. Griffin & Co. Ltd., 1953.
10. Hedges, B. Sampling Minority Groups. The Thomson Medals & Awards for Advertising Research, 1972.
11. National Readership Survey. Joint Industry for National Readership Surveys, 1968.
12. The British Chicken Industry. British Poultry Meat Association Ltd., 1972.
13. Annual Abstract of Statistics. No. J108, HMSO, 1971.
14. Peterson, R.A. & Ross, I. How to name new brands. *J. Advertising Res.* 12: p. 29, 1972.
15. Gabor, A. & Grainger, C. On the price consciousness of consumers. *Applied Statistics.* 10: p. 170, 1966.
16. Leavitt, H. A note on some experimental findings about the meaning of price. *J. of Business.* 27: p. 205, 1954.
17. Ölander, F. The Influence of Price on the Consumer Evaluation of Products and Purchases. (From: 'Pricing Strategy' by Taylor, B. & Wills, G. Brandon/Systems Press, 1970)

Some recent reports published by the Department of Agricultural Marketing

Report No.		
1	Butchers and Their Customers	Out of print*
2	Consumer Preferences for Beef Steaks	75p
3	Fat Cattle Auction Markets in Great Britain	75p
4	The Organisation of Fatstock Slaughtering	75p
5	The Competitive Advantages of Alternative Methods of Meat Retailing	75p
6	Potato Marketing Groups	75p
7	An Investigation of the Carcass Quality of Lambs and Hoggets with particular reference to the Cold-Storage of Home-Bred Lamb	75p
8	Systems of Management and Carcass Quality of Steers	75p
9	The Costs of Fatstock Slaughtering	Out of print*
10	Methods of Retail Beef Procurement	50p
11	Price Premiums for Quality Beef Steaks	75p
12	The Commercial Prospects for Frozen August Lamb	75p
13	In-Store and Central Pre-Packing of Fresh Meat - Comparative Costs	Out of print*
14	Co-operation and the Potato Market	75p
15	Butchers' Meat and Customers' Opinions in Five Towns	75p
16	Housewives' Attitudes to Meat	£1.00

The above are obtainable from:

The Department of Agricultural Marketing
The University
Newcastle upon Tyne NE1 7RU

* Xerox copies of these reports available at 75p each.

Printed by University Printing Service Limited, Newcastle upon Tyne