(4) Under a less meticulous system it should be possible to obtain more than 1 week's consumption from each family surveyed so as to correct for seasonal variation; consumption should be analysed systematically by months, quarters or seasons throughout the period of inquiry, having regard to the very striking results obtained for the congested districts from the present inquiry.

(5) Random sampling standard deviations might be supplied with the main estimates.

I understand that the Department of Health is considering the publication of a concluding part to the Irish National Nutrition Survey in addition to those parts relating to the five sections of the inquiry. This part would be, no doubt, designed primarily to give a description of sampling methods used and other methodological aspects of the inquiry not dealt with in the other parts. It may also be intended to include global totals for the country as a whole and perhaps for all town areas and all rural areas separately. If this is so, it would be well to correct the figures for possible bias, in so far as this can be done, using, perhaps, the methods of which examples have been given in this contribution. It also seems desirable to give some indication of the magnitude of the random sampling errors to which these global estimates are subject.

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The Results of the Irish National Nutrition Survey

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The results of the first four sections of the Dietary Survey phase of the Irish National Nutrition Survey have been published in some ninety-five separate tables, a number of them of considerable length. These tables are available (Department of Health (Republic of Ireland), 1949*a*, *b*, 1950*a*, *b*) but quite obviously it would be impossible to consider each of them in detail. I have decided that, in the time at my disposal, I could best present these results by attempting to answer the following questions: (1) What foods do the different sections of the population eat? (2) How is the consumption of these foods affected by variations in economic circumstances? (3) How does the intake of the several nutrients by the various classes surveyed compare with recognized standard requirements?

I think these questions will be found to be answered by Tables 1 and 2. I will discuss briefly the figures in these tables but it will not be possible in the time available to enter into comparisons between our results and those of other surveys. Comparisons of this kind are, of course, often of great value and we would be very interested to hear comments on food habits in Ireland from this point of view.

Foods eaten by different sections of the population

The following notes will serve to draw attention to the salient features of Table 1, in which the first of the above questions is answered.

(1) The consumption of butter and sugar corresponds very closely to the ration. The country districts had a higher consumption of butter than the towns, except for the

Table 1. *Average weekly consumption of foods per diet-head*

(Milk in pt., eggs in numbers, all other foods in oz.)

	Section 1, Dublin			Section 2, congested districts		Section 3, towns		Section 4, farming families
	Slum	Artisan	Middle class	Autumn	Spring	Large	Small	
Butter	7·2	7·4	7·8	9·9	3·7	6·5	6·8	11·1
Margarine	0·9	0·4	0·5	—	1·5	1·0	1·4	0·8
Other fats	1·6	1·7	1·7	0·4	0·3	1·3	0·5	0·4
Sugar	12·6	13·1	12·7	11·7	7·5	9·1	11·6	11·6
Preserves	2·5	4·0	5·8	3·2	1·6	4·0	4·3	4·6
Milk:								
liquid, condensed and dried, expressed as liquid	3·7	4·3	5·9	4·7	3·8	4·2	4·5	7·1
skim and butter-milk	0·2	0·1	0·1	5·9	1·6	0·2	0·5	2·1
Cheese	1·2	1·3	1·2	0·6	0·3	1·2	0·8	0·6
Eggs	3·2	3·8	5·6	3·3	5·2	3·2	3·7	6·4
Beef and veal	11·3	10·9	13·4	3·0	4·6	10·7	11·3	11·7
Mutton and lamb	3·6	4·3	9·0	6·3	1·9	4·5	3·0	3·0
Pork	1·0	0·9	1·4	0·2	0·6	0·8	0·2	0·5
Meat, cooked and canned	7·8	6·1	5·7	1·2	0·8	5·3	2·8	1·9
Bacon	5·1	4·0	5·7	2·2	2·6	3·6	3·4	10·6
Liver	0·9	0·7	0·7	0·2	—	0·6	0·3	0·2
Other offal	1·3	0·9	2·0	3·4	1·6	2·0	1·1	3·2
Sausages	2·5	2·3	3·1	0·9	1·2	3·6	2·5	2·2
Fish:								
fresh	3·7	3·5	3·5	6·4	2·7	2·0	2·5	2·5
processed	0·2	0·3	0·6	2·1	2·3	1·2	0·5	0·6
Potatoes	84·2	82·6	80·2	209·9	210·2	102·7	111·0	162·7
Other roots	2·6	1·5	2·7	5·2	2·4	11·9	7·3	11·8
Vegetables:								
green	12·5	18·8	26·3	11·8	1·8	8·0	11·1	22·3
miscellaneous	3·4	5·2	7·6	3·5	2·6	4·3	3·3	3·0
Legumes and pulses	1·4	1·7	3·6	0·1	0·2	1·4	1·4	1·0
Tomatoes	0·9	1·4	2·7	0·3	—	0·7	1·3	1·2
Fruit:								
fresh	3·1	5·0	16·4	3·0	0·5	4·9	3·6	4·3
bottled and dried	0·6	1·2	1·7	0·1	0·3	1·2	0·9	1·0
Flour, wholemeal and maize	3·8	7·6	15·4	132·3	73·7	12·0	29·8	65·5
Bread	93·8	91·9	68·1	16·4	12·5	88·0	64·0	38·2
Biscuits and cakes	2·2	2·2	7·5	0·5	0·4	2·3	1·6	1·6
Oatmeal and oat products	1·9	3·3	3·9	8·3	14·9	4·2	3·8	8·8
Other cereals	1·0	2·1	3·4	0·3	0·5	1·6	1·2	1·4

congested districts in the spring survey. The low consumption in this case was probably due to the fact that butter is dear at this time of the year and money is scarce. Margarine is not a popular food in Ireland, even when butter and other fats are not available.

(2) The consumption of milk is only about 0·6 pt./head/day, except in farming, and Dublin middle-class, families, and very little skim milk or butter-milk is used except in

the congested districts. Here the high intake of butter-milk is reflected in the satisfactory figures for calcium. The low consumption of cheese is a regrettable feature of Irish food-habits.

(3) In farming families almost everyone appears to have an egg daily but in other sections the average is only about four/week.

(4) The consumption of fresh meat is fairly constant from one section to another except in the congested districts where it is low, probably because of expense. People in country districts eat very little meat other than fresh meat. The consumption of bacon is low except in the farming families, and sausages and offal, including liver, are not extensively eaten. The intake of fresh fish is also low and that of processed fish is almost negligible.

(5) The figures for the consumption of potatoes reflect one of the traditional features of the food habits of this country. In the congested districts the average person apparently consumes daily about sixteen potatoes. It is also characteristic that the average consumption of fresh fruit and vegetables is low.

(6) The amount of flour and bread consumed is fairly constant except for the autumn sample of the congested districts. Here apparently the greater amount of physical work to be done calls for extra calories and this demand is met by an increase in the consumption of home-made bread.

Economic circumstances and food consumption

The answers to the second question will be found in the food-consumption part of Table 2. On the whole they are so obvious that they hardly require comment. Thus in each section in which it was possible to classify the families surveyed according to income, figures for certain foods like milk, eggs, meat, vegetables and fruit show a steady increase in consumption with increasing income, indicating that their intake in the poorer families was governed by considerations of cost and of expense of cooking. On the other hand, with flour and bread the consumption remained almost constant from one income group to another. The intake of bread was high in the lower-income groups. When the income increased the family sought variety by purchasing other foods, but did not eat more bread.

The intake of a third group of foods, of which cheese is a notable example, remained low in spite of increasing income of the consumer. Clearly if it were desired to encourage the consumption of cheese it would be necessary to resort to propaganda. Reducing its price or increasing the purchasing power of the poorer sections of the people could hardly be expected to produce much effect.

The relatively high intake of fish in the congested districts was, of course, determined by geographical considerations.

Food intake and requirements

The nutrient-intake part of Table 2 carries the answer to the last question. In preparing this part of the table the standard of requirements adopted was that of the League of Nations Technical Commission on Nutrition as adapted by Magee (1945). It is clear from these figures that there is no serious deficiency in either total protein or

calories in any of the groups surveyed. The very satisfactory figures for iron, vitamin B_1, and nicotinic acid are to be attributed to the use of high-extraction (85–90 %) flour. The consumption of vitamin C was also satisfactory in all groups except the poorer families in the Dublin slums. The principal source in Irish diets is the potato and it is likely that the restriction of cooking facilities in slum rooms is the explanation for the deficiencies noted. Riboflavin intake was also somewhat below the requirement figure in the lower-income groups of towns.

There is evidence of more widespread defects for calcium and vitamin A. As might be expected, the position with calcium was most serious amongst the lower-income groups of towns, particularly Dublin, where the full requirement was not satisfied until the income reached 30*s.*/head/week. This is related to the low intake of milk and the position would have been even worse were it not for the addition of acid calcium-phosphate to baker's flour at the rate of 24 oz./sack about half-way through the Dublin survey. This practice is still in operation but at the reduced rate of 14 oz./sack, so that the calcium intake in Dublin is probably somewhat higher now than the average figures for the survey suggest but the difference cannot be very great. Neither for this nutrient nor for iron was any allowance made for factors that might affect availability. The unsatisfactory intake of calcium is interesting in view of the high incidence of rickets in Dublin at, and for a few years before, the time of the Dublin survey.

The various instances of deficiency in vitamin A intake were due to the small consumption of green vegetables.

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Agricultural Implications of the Results of the Irish National Nutrition Survey

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This country, in portions of which the dietary survey under review was conducted, is predominantly agricultural. Mixed agriculture, that is to say tillage cropping and animal production, is practised, and the excess of total food produced over the human food requirements of the country is reflected in the fact that some 70 % of the annual exports take the form of human food, mainly livestock and livestock products. Normally we import a considerable proportion of our bread grain though, during the war and subsequently, home production was made to meet the greater part of our requirements. To supplement the coarser grains produced at home we import animal foods, including maize; since the resulting animal products are exported to feed people elsewhere, this is considered good economy, and an appropriate flow of trade in human and animal foods.