AN INVESTIGATION OF THE DIET OF SCHOOL CHILDREN

BY

A. ANDERSON, M.D., D.P.H.
MEDICAL OFFICER OF HEALTH, CHORLEY

In recent years increasing attention has been given to the diet of the nation. Nutrition surveys and other investigations have revealed the necessity of an adequate and balanced diet, and emphasis has been placed on the importance of first-class protein, vegetables, fruit, milk, vitamins, etc. Again, the economic depression has focused attention on the minimum quantity of food required and on the cost at which such food can be obtained.

The object of the present investigation was to ascertain the usual constituents of the diet of school children in an industrial town. No attempt at quantitative analysis has been made.

Recording the Diets

All the children attending the upper departments of the elementary schools in Chorley were asked to write down what they had eaten for breakfast, dinner, tea, and supper on Tuesday, September 17th, and on Tuesday, December 10th, 1935. Each meal was recorded on a separate piece of paper, and neither the name of the child nor the school was given. The children were not informed of the reason for this request, and in an endeavour to remove any competitive element from the recording of meals the proposition was put to the children as a memory test. On the Tuesday afternoon they were asked to write down what they had had for breakfast and dinner on that day, and on the Wednesday morning they recorded what they had eaten for tea and supper on the previous day. Tuesday was chosen because it is a market day in the town, and because the diet on that day is subject to no sectarian influence. The disadvantage of obtaining records for one day only is recognized, but to secure them for a longer period would have entailed dealing with a selected group of children.

Chorley is a market town with a population at the 1931 census of 30,796, and it is surrounded by a considerable rural area. The chief industries are cotton spinning, weaving, bleaching, and finishing, motor manufacture and repairs, and laundries. A large proportion of female labour is employed. The average number of persons registered as unemployed in one week of each month during 1934 was 1,920 men, 1,070 women, and 166 juveniles, and during 1935 it was 1,914 men, 1,022 women, and 164 juveniles. The amount of out-relief disbursed to Chorley residents was £13,002 in 1934 and £16,862 in 1935.

Classification of Items

Records of 9,698 meals were obtained in September and of 8,432 meals in December, the difference being due to the lower attendance of children in December. Forty-seven of the September records and fifty-two of the December ones were discarded as illegible or unintelligible. Where "nothing" or "none" was recorded that meal was excluded, and the total of meals available for analysis was as follows:

	Breakfast	Dinner	Tea	Supper
September ...	2,409	2,403	2,415	1,933
December ...	2,131	2,129	2,123	1,506

The headings under which the constituents of the meals have been classified have been made as simple as possible. Bread-and-butter, etc., includes bread and margarine and bread dipped or fried in fat. Milk, etc., includes ovaltine, malted milk, and such drinks as are usually made with milk. Cake, etc., includes biscuits and all forms of sweet cake, slab cake, or buns. Jam, etc., includes marmalade, honey, syrup, and treacle. Every effort has

been made to classify the various items as accurately as possible—for example, meat sandwiches are classified as bread-and-butter and meat. Where any item shows a percentage frequency of less than 0.1 it has not been included in the table.

It will be seen that "tea" and "bread-and-butter" each form part of 70 per cent. of breakfasts; "tea and meat and potatoes" about 60 per cent. of dinners; and "tea and bread-and-butter" over 70 per cent. of teas. Many of the children have a light meal in the middle of the day and their chief meal is tea—the familiar high tea so common in industrial areas. Supper is a variable meal, but the consumption of a heavy meal before going to bed was recorded much more frequently than was anticipated.

Percentage Frequency of Certain Items in the Diet of School Children

	Breakfast		Dinner		Tea		Supper		Total Meal	
	Sept.	Dec.	Sept.	Dec.	Sept.	Dec.	Sept.	Dec.	Sept.	Dec.
Tea ...	72.1	66.4	63.3	69.4	87.6	87.6	35.4	35.6	67.5	67.1
Cocoa ...	11.6	14.4	2.1	3.1	1.8	2.6	16.2	22.6	7.5	9.8
Coffee ...	6.5	7.8	2.3	3.6	1.1	1.6	3.7	4.8	3.5	4.4
Milk etc. ...	4.4	5.1	3.7	2.8	2.6	2.1	25.5	27.6	8.2	8.0
Water ...	0.7	0.7	6.6	5.6	0.9	1.1	6.6	5.6	3.5	3.1
Mineral waters, etc.	—	—	1.5	0.3	—	0.1	0.8	0.3	0.6	0.3
Soup ...	—	—	3.6	4.4	1.4	2.7	0.5	0.5	1.4	2.0
Oxo, bovril, etc.	0.3	0.3	—	0.1	0.2	—	0.7	1.0	0.3	0.3
Bread (dry)...	19.7	16.9	22.1	18.6	18.0	16.6	14.3	12.1	18.8	16.3
Bread-and-butter, etc.	72.1	73.1	41.9	43.2	73.3	72.6	37.5	34.2	57.2	57.5
Cake, etc. ...	18.2	15.9	20.0	21.7	41.1	41.7	30.4	31.9	27.3	27.4
Jam, etc. ...	26.0	20.5	4.6	3.6	17.2	13.1	13.9	11.1	15.5	12.2
Egg ...	27.9	23.4	7.8	6.0	4.9	5.6	0.5	0.1	10.8	9.5
Meat and bacon	22.1	21.4	59.5	57.1	25.0	31.5	3.8	4.0	28.8	30.5
Fish ...	—	0.1	3.5	2.9	10.5	9.5	1.8	0.7	4.1	3.6
Potatoes ...	0.2	0.4	68.9	69.5	33.1	38.3	13.6	10.9	30.0	31.2
Vegetables, raw	—	—	0.2	0.2	3.0	1.6	—	—	0.8	0.3
„ cooked	0.8	0.2	21.5	17.7	6.9	7.0	1.5	1.3	7.7	7.0
Cheese ...	2.7	2.2	0.9	0.8	3.6	4.3	2.0	2.3	2.3	2.4
Cereal ...	15.0	16.7	0.5	0.6	0.6	0.3	5.6	4.7	5.4	5.7
Fruit and tomatoes	13.0	7.4	12.9	8.7	30.9	12.7	3.8	1.7	15.8	8.0
Pudding ...	—	—	8.2	8.0	1.6	1.7	—	0.2	2.6	2.7
Milk pudding	—	—	9.6	8.0	—	0.7	—	—	2.5	2.4

Some Deficiencies of the Diets

A study of the table shows that milk, soup, eggs, fish, cheese, fruit, vegetables, and pudding do not appear in the diet as frequently as is desirable. Even if allowance is made for milk which is consumed in varying quantity with tea, coffee, cocoa, and cereals the position is far from satisfactory. It is well known that children whose diet is inadequate or unsuitable may show no signs of malnutrition. During 1935 I examined at routine medical inspection 1,280 children in the upper departments of the elementary schools and classified them on a nutritional basis as "excellent" 19.3 per cent., "normal" 68.2 per cent., "slightly subnormal" 12.3 per cent., and "bad" 0.2 per cent.

A study of the individual records showed little evidence of home cooking. This was emphasized by the frequency with which the children recorded that certain foods were "home-made" or "shop." In 200 consecutive meals in which potatoes were recorded the children described them as follows: chips 105, chips (home-made) 10, chips (shop) 62, and potatoes 23. Meat occurred with distressing frequency as meat pie, pork pie, meat and potato pie, corned beef, etc. Fruit usually appeared as tinned fruit,

or in pies or tarts. Cake or biscuits was the usual substitute for pudding. Personal observation between the hours of noon and 1 p.m. of shops selling prepared foods has confirmed this. Apart from fish-and-chip shops there are fifty-four premises in the town registered for the manufacture and sale of potted or preserved meat, etc.

In comparing the September and December dietaries there is little significant difference except in regard to fruit and jam, which occur less frequently in December. Little advantage seems to be taken of the abundance of vegetables available in September. On the whole the December dietary appears to less advantage than the September dietary. Further, 24.6 per cent. of the children recorded "no supper" in December as compared with 19.9 per cent. in September. Another matter not shown in the table is that in December the milk-in-schools scheme was in abeyance, whereas in September 1,012 of these children were consuming an additional third of a pint of milk.

Obviously many fallacies can exist in this type of inquiry. The most important is connected with the accuracy of the children's replies. It is highly probable, however, that omissions were few, as many of the

records were given in great detail, and included such items as liver salts, medicine, tonic, and malt and oil.

Summary

1. A tabulation has been made of the items of 9,160 meals consumed by school children on September 17th, and of 7,889 meals consumed on December 10th, 1935.

2. The percentage frequency with which various foods occur in these meals has been recorded.

3. The diet appears to be deficient in milk, soup, eggs, fish, cheese, fruit, vegetables, and puddings.

4. Only a small proportion of the children show clinical evidence of subnormal nutrition.

5. Evidence is produced to show that cooking in the home is not practised to any great extent.

6. The dietary in December is less satisfactory than in September.

I wish to express my thanks to the Secretary of Education and the heads of the upper departments in the elementary schools by whose co-operation and assistance this investigation was rendered possible.

SAFETY ON THE ROAD

LIGHTS, KERBS, AND CROSSINGS

The regulations issued by the Ministry of Transport regarding the head- and side-lights of motor cars, which will come into force this autumn, will be welcomed by medical practitioners and others who are required to drive at all hours and in all weathers. Those limiting the power of the light of side-lamps and requiring that there should be suitable provision for the prevention of glare from head-lamps are eminently reasonable. They are also practicable; indeed there are but few cars on the road that do not now conform to these rules. The chief offenders against the one regarding side-lights are certain trade cars and some luxury cars. On some vans and taxicabs, and on a few big cars, the side-lamps are fixed to the dash, just at the level of the eyes of the pedestrian and the car driver. The improvements in batteries and lamps have resulted in increased lighting power until the side-lamps are little less effective than head-lamps. Almost the only cars that offend against the head-lamp rules are those with fixed lamps. Yet these can easily be made to conform to the rule by slightly shifting the near-side head-lamp so that its rays are projected a little to the left and downwards, and inserting a hand switch in the wire of the offside head-lamp.

Readers will remember the claims put forward by certain vendors of yellow glass, and the experimental observations published thereon in our columns (*British Medical Journal*, January 26th, 1935, p. 168). More recently startling claims for the advantages of yellow light for all driving purposes have come from a Paris committee. The British Minister of Transport referred that report to the British Medical Association, which appointed a special committee under the chairmanship of Sir Joseph Barcroft, professor of physiology in the University of Cambridge. This committee concluded that the Paris committee had made extravagant claims for the superiority of yellow lights over the ordinary "white" variety. (*Supplement*, April 25th, p. 225.)

Visibility through fog in daylight is beyond human control, but we have recently seen a fog lamp that bids fair to be of real use at night. The new lamp (Lucas's "passlight" or fog lamp) uses a brilliant white light, but this is projected in a special way. It has been known for many years that if a hood were placed over a lamp so as to prevent the light rays rising upwards one could

see over the projected beam such objects as were in the line of the beam. In this new lamp the bulb has a close-fitting hood covering the upper and front part. The rays are projected forwards by two reflectors: the upper, filling half the case, is just the half of the usual parabolic reflector, with its focus behind the lamp so that it throws its rays forwards and downwards; the lower is the half of the other, but is tilted and pushed forwards "out of focus," so that it also projects the light forwards and downwards. The result is a remarkable beam of light, fan-shaped, with an upper horizontal edge, thus . A demonstration with muslin curtains was most convincing. At the far end of a windowless passage was fixed the rear wheel of a bicycle with its white mudguard and red reflector shining in the rays of the ceiling light. Two parallel curtains a foot apart were drawn, and the view was lost. A yellow "fog lamp" was switched on, but only served to make the curtains yellow. When only the new lamp was switched on the curtains were bright below and dark above, and through that unlighted part one could see clearly the bicycle wheel and reflector shining in the lower beam of light. Practical usage of the lamp proves that it has real advantages.

Recent observations of the Ministry of Transport that the majority of road accidents occur on straight roads and with good visibility suggest that it is the apparent ease of driving in good conditions that leads to lack of care or to the taking of risks, and there is some reason to think that the speed at which crossings are approached is responsible for a high proportion of accidents. Too often the existence of the crossing is unknown or unseen till too late. One of the best means of indicating the presence of crossings (other than signals) is that adopted in the area of Mitcham, in South London, where a length of kerbing about thirty feet at each corner of a crossing is whitened. These white lines are visible for long distances, and much more readily than lines in the middle of the road, or beacons, or studs—indeed, studs set across the road are puerile. A writer in the *New Statesman and Nation* has suggested lately that all kerbs should be whitened and new roads edged with white concrete. This plan can be seen carried out on the road to Eastbourne through Ashdown Forest. But while lines are an excellent guide in the dark, in the day time the gaps in the continuous white line are not so conspicuous and emphatic a warning as are the occasional white kerbs at the crossings.