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School Milk in Britain, 1900-1934

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Abstract

The paper explores the early history and significance of school milk in Britain. As a food for children, milk was not attractive at the beginning of the twentieth-century. It had an image problem of being both expensive and potentially infected. In addition, successive governments were wary of creating expectations of the delivery of welfare items such as free or cheap milk. How is it then that by 1934 milk represented nearly two-thirds of the “meals” served in schools? The answer lies partly in the efforts of the trade to extend its market beyond the home, and partly in the scientific finding that milk is a balanced and nutritious food. Both the local and the central state were eventually persuaded of the logic of a “Milk in Schools Scheme”, which, after the end of the period covered in the paper, did become official and was extended nationwide.

School Milk in Britain, 1900-1934[1]

It seems to be generally accepted that school meals played a small but important role in the creation of conceptual and practical space for the first green shoots of the modern welfare state, and that their provision, no matter how modest at the outset, therefore represented a major departure in the history of social policy.[2] For Bentley Gilbert:

> The passage of the Education (Provision of Meals) Act of 1906, and the Education (Administrative Provisions) Act of 1907, establishing medical inspection in State schools, marked the beginning of the construction of the welfare state. For the historian, feeding was the more important measure, not because it was wider in scope or more beneficial, but simply because it occurred first.[3]

Thus the Liberal Party's reforming administration of 1906-1914 began with legislation on free school meals and school medical inspection.[4] According to Pat Thane, this "was the first extension from the field of schooling into that of welfare of the principle that a publicly financed benefit could be granted to those in need, free both of charge and of the disabilities associated with the Poor Law", and Charles Webster suggests that "the foundations were laid for the principle of providing publicly funded welfare benefits for an entire class of recipient without the imposition of the kind of limitations traditionally imposed under the Poor Law".[5] In more general terms, Ulla Gustafsson has asserted that school meals "inform our understanding of the relationship between the state, the family and children".[6] These claims of a foundational role for school feeding in the emerging governance of the social have been pursued in the literature in two main directions.

First, there has been work on feeding as a means of addressing social ills, such as the widespread child malnutrition that constrained the cognitive skills of pupils. This discourse is centered on the medicinal value of solid food, milk, and cod liver oil. Authors in this tradition often begin with the debate about the bodily strength and fitness of the nation following the debacle of the Boer

War, when so many potential recruits were shown to be physically unfit for action.[7] Three major official enquiries in the years 1903-1906 debated the causal significance of poverty but also put stress on malnutrition and undernutrition as major issues.[8] This attention to "physical deterioration" at the "macro-scale" suggested a need for intervention by the state, and one of the most important recommendations to emerge from the 1905 Inter-Departmental Committee on Medical Inspection and Feeding of Children Attending Public Elementary Schools was that LEAs (Local Education Authorities) should be enabled to provide meals in the school setting.[9] The Education (Provision of Meals) Act of 1906 that followed, together with revised and extended Acts in 1914 and 1921, empowered LEAs to plan a feeding regime, especially for children who were "unable by reason of lack of food to take full advantage of the education provided for them".[10] No advice was given at this stage on the amount or type of food to be provided and local responses were varied according to micro-political context.[11] Bernard Harris's account of "the health of the schoolchild" is especially interesting because he looks in detail at the school medical service and traces the implementation and consequences of school feeding policies.[12] In his view, school meals represented "a major extension of public welfare provision", although in some areas "the number of children who were reported as being malnourished often bore little relationship to the number being fed".[13]

Second, there is a growing theoretically-informed literature on the use of school meals as means of disciplining the behavior, as well as the diet, of working class children. Behind this is Michel Foucault's attempt to ground the political in the everyday and to explore the dispersed nature of power in settings such as schools, prisons and hospitals. Gustafsson has claimed by extension that school meals were in effect a form of embodied discipline and that the orderly setting in which they were served was a template for children's minds.[14]

In one strand of this theoretical type of literature, school meals are seen through the lens of Beck's "risk society", particularly developing the idea that the emergence of the welfare state in the early twentieth century represented a collectivization of risk management.[15] There is scope for investigating this

further through the widespread perception at the time that milk had protective qualities,[16] set against, in the public mind, the well-known risks of individual infections (such as bovine tuberculosis) and of epidemic diseases (such as typhoid or scarlet fever) carried by milk.[17] But research on the role of school milk (and meals) in persuading parents and children of the possibility and desirability of dietary change is only just beginning.[18]

Surprisingly perhaps, there has not been much detailed discussion of school milk for the period 1900-1934. John Welshman has provided a commentary on the legislative and regulatory context of meals generally, along with a discussion of the nutritional impact, but he does not touch in-depth on school milk before 1934.[19] As noted above, Bernard Harris has written the definitive history of the school medical service, in which he provides full data on various types of school meals, but it is not his mission to provide an analysis of milk.[20] Charles Webster has looked at milk provided by welfare services in the 1930s.[21] John Hurt and John Burnett both introduce milk as an important element of their broader histories of school feeding, and Deborah Dwork alerts us to the dangers of milk-borne disease in a chapter colorfully entitled "milk or 'pus as a beverage'".[22] There are also various accounts that advance an economic hypothesis of the origins of school milk in the 1920s and 1930s.[23]

My contribution in this paper will be to look critically at the evolution of school milk schemes up to 1934. I intend to challenge the consensus referred to in the first paragraph above and to argue for a reassessment of both the nutritional and symbolic value of school milk in this period. In my opinion, the introduction of school milk cannot be associated, other than through a co-presence, with the significance that some writers attribute to the extension of local state welfare through school meals from the beginning of the twentieth century.

The paper's focus will be mainly upon England and Wales, but brief attention will also be paid to the somewhat divergent experience of Scotland. This is important because of the different institutional and legislative histories either side of the border and the fact that one of the main actors, John Boyd Orr, based his nutritional research in Scotland. The terminal date is October

1934, when the National Government launched its own Milk in Schools Scheme, inaugurating a new era of school milk provision.[24]

The paper begins with some introductory points by way of background and an early history up to 1921. The argument then branches, on the one hand, into an account of the significance of the London experience in the 1920s and, on the other hand, into a narrative of the implications of the discovery that milk is rich in vitamins and minerals. The latter section touches on what, in many ways, was the most important milk-feeding research project ever, planned and executed by Dr Corry Mann. Also the point is established that exhortation for children, and the public generally, to consume more milk was based on scientific findings about nutrition. There are two further sections. The first argues that school milk up to 1934 was in reality dominated by a commercial logic, and the second looks at further work on milk-feeding undertaken in Scotland in the late 1920s and early 1930s. Finally, there is a revisionist conclusion about school milk in the period under review.

Background

The discursive framing of school feeding shifted at the turn of the century. Before that, there was an emphasis on poverty, with midday meals supplementing the diet of the young and vulnerable members of poor families in the slum areas of London and other cities, partly for humanitarian reasons but also as a preventative measure to maintain social stability.[25] For example, in the capital in 1904, the London School Dinners' Association, the Destitute Children's Dinner Society and similar charitable organizations between them attempted to feed the 16 per cent of the elementary school population that was said to be undernourished.[26]

In the first few decades of the twentieth century the nutrition debate acquired a new face. In addition to deliberation about quantity of food intake, there was a growing realization that the quality and composition of foods also mattered. Specifically, the discovery of vitamins and their role in deficiency diseases focused attention on foods containing particular "accessory food factors" and demonstrated that the relationship between food intake and health

was complex.[27] Frederick Gowland Hopkins was one of the pioneers of vitamins in the 1910s and 1920s, along with Casimir Funk, Elmer McCollum and many others.[28] As a result of their efforts, a consensus grew gradually as the "facts" about vitamins emerged, but it was the mid-1930s before there was broad agreement on the daily requirements for some vitamins.[29]

Milk was one of the main foods to benefit from these discoveries in terms of its image. Apart from its very positive, traditional associations with babies and motherhood, it was increasingly in the 1920s seen as "a complete food" because of its balance of fat, protein and vitamins. Dr Hamill, a Medical Officer with the Ministry of Health, spoke for many when he called it "the most important of the protective foods".[30] It is not surprising, therefore, that milk was increasingly seen as suitable for children, despite its expense relative to starchy staples such as bread and potatoes.

A third point to make by way of introductory context is that in the 1920s and 1930s there was a widespread but controversial belief that child malnutrition was the result of maternal ignorance, inefficiency or fecklessness.[31] If the parents could not be relied upon to provide an adequate diet for their children, then intervention was said to be justified in the setting of the school or the clinic, and the logic was one of an investment in the nation's human resources. Related to this were concerns about the impact of poor diet upon the fertility and physical vigor of the nation. Schools, with their captive and pliant pupils were key targets for investigation in this era and the introduction of school milk suited a eugenicist agenda that sought a self-sustaining racial health through education, as did that of home economics and physical education.[32] To give an example, one result of the Lanarkshire feeding investigation that we will discuss later was said to have been that school milk "would have a powerful influence in improving the quality of the Scottish race".[33]

Finally, the whole dairy industry in Britain, from the farmers to the milk manufacturers and distributors, had an interest in encouraging the consumption of their products. Liquid milk was a particular problem for them because at times in the 1920s and early 1930s there were gluts of production that could not profitably be sold due to stagnant demand and chaotic market conditions.[34] The

latter was partly because many consumers were unhappy with the average quality of milk, which experts also agreed was unacceptable. Adulteration with water was less of an issue after the First World War than it had been previously,[35] but some milk was still produced in dirty conditions.[36]

The initiation and encouragement of school milk schemes was also a priority of governments in the 1930s, in their desire to support agriculture. In schools there was a new generation of consumers, who were in no position to refuse their milk on the grounds of quality and who might be persuaded to form a milk-drinking habit for the future. In one sense this bears out the commonly expressed view that one of the primary functions of education is training for a life of consumption.[37]

The Early History

Evidence to the Inter-Departmental Committee on Medical Inspection and Feeding of Children Attending Public Elementary Schools gives a snap-shot of school meals in 1905. In London, the Joint Committee on Underfed Children did not keep relevant records but anecdotal evidence indicates that milk meals were present in very few schools.[38] At this stage milk was used as a special feed for "delicate" individuals, for limited periods of weeks, rather than as a long-term, general supplement.[39]

The suggestion of one of the Inter-Departmental Committee's witnesses, T.E. Harvey, a Deputy Warden at Toynbee Hall, must therefore have seemed eccentric. He advocated the supply of milk to all of London's schools; half a pint daily "would meet a good deal of the difficulty with regard to malnutrition as well as the difficulty of underfeeding" and he proposed that the milk should be paid for by the LEA if charitable funds were insufficient.[40] One of Harvey's statements is illuminating because it implies that milk was simply not a priority in the minds of many poor consumers and that there would therefore be no problem of the substitution effect, where food would be withheld in the home because the child was being fed elsewhere.

> It has an important advantage, in not appearing to the parent to be supplying food…milk is not considered to be a food, and parents certainly would not feel relieved of the responsibility of providing breakfast because the children were going to get milk at eleven o'clock.[41]

The Toynbee Hall enthusiasm for large-scale milk schemes was not widely shared. It is true that the passing of the 1906 Act encouraged more SMOs (School Medical Officers) in London to prescribe milk or cod-liver oil for debilitated or anemic children but such initiatives remained rare.[42] Where they existed, there was often an explicit goal of targeting hunger, for instance in Bethnal Green, in the working class East End of London, from 1908 onwards. In the winter of 1909-10, Dr Hawkes, a part-time SMO there, examined fifty-seven boys and 109 girls in Wolverley Street School and identified twenty-four of the boys and sixty-one of the girls as being "underfed". These children were then given a teaspoon of cod-liver oil in a cupful of warm milk every day during the morning interval.[43] After a year of supplements, only nine were thought still to be clinically malnourished. This kind of study, although not conclusive in its own right, laid foundations for later research that sought to provide scientific backing for large-scale feeding interventions.

Because of widespread popular skepticism about the agenda of school meals, for instance concern about undermining the responsibility of parents, it was politically impossible to introduce school meals legislation that was more than transitional from Victorian ideas about welfare and poor relief.[44] The 1906 Act thus required the recovery of the full cost of school meals from the parents wherever possible and inevitably this was a limitation on the spread of milk-feeding. The London County Council (LCC) in 1909 decided to dispense milk in cases of "special necessity or delicacy", and milk clubs became popular in a few schools, with teachers collecting the children's halfpennies for a mid-morning glass full. In 1914 the financial arrangements were modified so that LEAs could raise funds to administer such schemes from the rates without the approval of the Board of Education. But the consolidation of many measures in the 1921 Education Act and the restatement of the principles of school feeding made it

the much more significant threshold, completing the necessary foundation work for the extensive adoption of milk in schools. In London:

> Thus commenced a practice which proved of great importance. It rapidly spread from school to school in London and became a recognized part of the LCC's measures for combating ill-nourishment in school children. Later the example of London was followed by many of the provincial authorities.[45]

Part of this early history of school milk was the cultivation amongst parents of a felt need for, and a familiarity with, publicly-provided feeding facilities. The most important example of this came before the First World War when there was much discussion of the links between the low levels of breastfeeding in some sections of society and high rates of infant mortality. To combat a perceived link between ill-health and the low milk intake of babies, infant milk depots were established by some Local Authorities to provide subsidized milk. For a number of reasons beyond the scope of this paper, these depots were not a success but they did contribute to the idea that active nutritional intervention by the state was both possible and desirable and they brought milk a higher profile.[46] During the War the idea of state protection was taken further when Local Authorities were authorized, under the Defence of the Realm Act, to prioritize the needs of nursing mothers and children under five at a time when liquid milk supplies had declined.[47] Then the Maternity and Child Welfare Act (1918) provided a generic basis for free or reduced-price milk.[48] By 1934 milk schemes under this Act accounted for five million gallons per annum, half of which was dispensed in the form of milk powder, and there was a further expansion in 1940.[49] My focus in this paper, however, is upon school milk rather than the broader field of welfare provision.

London in the 1920s

In April 1920 a conference was held at the Ministry of Health on the value of milk as a food and the need for a clean supply.[50] It was agreed that "an

extension of the provision of milk at schools would be most effective" as a policy. At that stage only a few thousand necessitous children were receiving milk in London and not many more elsewhere.[51]

The LCC was generally favorable to the concept of school milk, and proved to be one of the most progressive authorities in the country. Under Section 84 of the 1921 Act they could supply meals to children "unable by reason of lack of food to take full advantage of the education provided for them", free of charge where children came within the scope of "necessitous".[52] However, such a vague definition left plenty of scope for variation of practice.[53] In theory the authentication of an SMO was needed, but the reality was that head teachers usually made the selection.[54] Children who were not visibly malnourished often fell outside the safety net because teachers were not trained to recognize problem cases and, anyway, there was a lack of an administrative consensus about an objective physical index of nutritional status.[55] Means testing was used in many schools as a filter on the assumption that children from the poorest families were the most necessitous with regard to milk.[56] In 1923 the LCC reminded Care Committees and head teachers that other children could also be provided with milk on pre-payment by the parents of the full cost.[57] Milk clubs organized locally were encouraged and eventually began to flourish in the capital.[58] One consideration was that:

> Necessitous children can get sufficient starchy food at home, and school feeding is mainly confined to supplementing the protein portion of the diet. The London rule is that every meal for a necessitous child shall contain at least 25 grams of protein.[59]

One sign of the increasing scale of school milk provision in the county of London came in November 1921 when the LCC started contracting for bulk supplies for twelve months at a time. The savings on such large orders meant that parents no longer had to bear the former farthing service charge. In 1922 nearly 9,000 necessitous children were receiving milk (Table 1) and the Chief Medical Officer of England and Wales, George Newman, soon after was moved

to comment that “it is a very new game, though quite a good one”.[60] Most of these feeds were over limited periods. In the East End of London in 1923 3,718 school children were receiving milk on doctor’s orders, of whom 13.8 per cent were given it for up to six months, until their nutritional status returned to normal, 27.8 per cent for six to twelve months, 31.3 per cent for one to two years, and 18.1 per cent for more than two years.[61]

< Table 1 here >

In London as a whole, this feeding of necessitous children quintrupled between 1924 and 1936, and the numbers of ill or malnourished children who paid for milk supplements more than tripled. In addition, the milk club idea had taken root by 1925 amongst the parents of non-necessitous children.[62]

Although London was among the pioneers of school milk, the intellectual and political leadership was provided in parliament, by MPs such as Christopher Addison and Walter Elliot. Their inspiration was non-partisan and came from their experiences of serving both in the Ministry of Health (Addison, Minister 1919-21; Elliot, Parliamentary Under-Secretary for Health in Scotland 1924-26, Minister of Health 1938-40) and the Ministry of Agriculture (Addison, Minister 1930-31; Elliot, Minister 1932-36). Although the interests of the two Ministries were very different, and at times diametrically opposed, nevertheless there was unanimity about the need for the expansion of school milk. This came to fruition in the early 1930s when both Addison and Elliot, from the Labour and Conservative parties respectively, argued that corporate agriculture, under government influence, was a potentially powerful solution for problems of recession and child malnutrition.[63] School milk was swept along on this tide of history.

Milk and nutrition

Investigations in the 1920s and 1930s into the relationship between milk and the physical growth of school children were to prove decisive in persuading parents and teachers that school milk was a cost-effective food. Research

began in the United States in 1919, when Elmer McCollum chose an institution of black children for a two year study.[64] He selected eighty-four, aged from four to ten years, and gave half of them two pints of reconstituted dried milk a day. The other half were used as controls. The results convinced McCollum that milk contributed well to child growth but there were problems with his research because the institution began to feed all of the children better now that they had come under outside scrutiny. This disturbance affected the results and undermined the certainty of his conclusions.[65]

The nearest equivalent in Britain was the work of Harold Corry Mann and it is worth spending some time on his research because it was so influential in persuading policy-makers of the potential value of school milk in the short-term for the nutritional status of children and in the long term for the health of the nation. Corry Mann worked with the MRC (Medical Research Council) from 1914 onwards and, before starting on his milk project, had been involved in a major study of the social and dietary context of rickets from 1919 to 1922.[66] His mentor was Professor Frederick Gowland Hopkins, of Cambridge University, a strong ally to have in the internal politics of the MRC.

In May 1921 the MRC's Accessory Food Factors Committee discussed and approved the outline of a scheme proposed by Dr A.W.J. MacFadden, Senior Medical Officer at the Ministry of Health, for "the study of the effects produced in the growth and nutrition of underdeveloped children by the addition of milk to a standard diet".[67] Corry Mann was involved from an early stage and assisted in the search for a suitable institution at which the experiment could be conducted. The Dr Barnardo's boy's home at Woodford in East London was selected and United Dairies were persuaded to donate a supply of milk.[68]

This institutional setting allowed a greater degree of control over feeding than McCollum had found possible. The 220 boys were permanently housed in separate cottages in the enclosed grounds of the home and they were fed in a central hall, where each of six groups received foods supplementary to their normal rations.[69] As we can see from Table 2, only forty-one boys were given milk, but the results were said to prove the "great superiority of milk over other food materials…But they also made it clear that milk given whole was much

superior in its growth promoting properties to its two main constituents, fat and casein, given separately".[70] Nutritional reasoning deployed by Celia Petty has shown that Corry Mann's analysis of his results was flawed and that much of the growth demonstrated by children on the milk diet was probably due to catch-up growth by the previously malnourished.[71] This growth correlated with the additional calories they received, and did not prove the existence of some unknown growth factor in milk. The modern literature shows little evidence of an association between school milk provision in Britain and the growth of children in the age range 5-10 years, even when controlling for economic status or ethnicity.[72] However, in Less Economically Developed countries in Asia and Africa today there is evidence of significant growth spurts in the poorly nourished when given milk at school, the equivalent situation to working class children in early twentieth century Britain.[73]

< Table 2 here >

Corry Mann's work was remarkably influential,[74] but it is important to point out that his career as an MRC staff researcher was mixed in terms of internal scrutiny. In an encomium of 1922, Dr MacFadden praised his "exceptional gift for extracting details, marshalling them properly and noting down with scrupulous care. In fact he seems to me to be exceptionally well fitted for carrying out fieldwork which calls for the rarer qualities of patience, persistence and accuracy".[75] Later, Walter Fletcher, Secretary of the MRC, claimed that Corry Mann was "an almost perfect research assistant for this kind of work. He has almost a genius for attention to detail and unflagging keenness and industry".[76] In 1924, when Fletcher solicited scientific opinions about Corry Mann's progress, most of the referees were impressed. Professor Greenwood, Professor of Epidemiology at the University of London, thought that the work to date had been "carried out most conscientiously and accurately", and Frederick Gowland Hopkins was "certain the work done so far will prove very valuable".[77]

However, Corry Mann's early work on rickets was criticized for statistical inaccuracies by Professor Diarmid Noel Paton, Regius Professor of Physiology

at Glasgow University and no enthusiast for biochemistry, who then complained several times about the milk research that followed.[78] In 1924, for instance, Noel Paton asserted that Corry Mann did "not seem to have the knowledge to make him an independent investigator. He gives no indication of knowing any of the work which has been done on the subject on which he is engaged", and a few weeks later Noel Paton dismissed an interim report on the feeding experiment as yielding "no new results".[79] Before taking such criticism at face value, Noel Paton's own personal agenda should be taken into account. Smith and Nicolson have claimed that he was skeptical of the role of vitamins in diseases such as rickets. Along with others in the "Glasgow school", he would therefore have had a vested interest in denigrating Corry Mann's research.[80]

Walter Fletcher, although a vitamin enthusiast, himself wrote several stinging letters to Corry Mann about his slow progress, and he showed irritation at Corry Mann's continued requests for extensions to his funding.[81] Corry Mann was paid a salary of £800 and the total cost of £2,000 a year made this one of the MRC's largest research projects at the time. Part of the problem was uncertainty about his status. The MRC wrote to him from time to time reminding him of the pending termination of his contract, but he does not seem to have taken this seriously because Hopkins had promised him permanency. When the funding was finally withdrawn, Corry Mann claimed to have been "completely misled both as to the continuity of my service and the terms of my service. It's the greatest shock that I've had in my life".[82] The Council does seem to have felt some moral obligation because he was given a further grant for two years beyond the child feeding work, until April 1928 and "without fixed conditions of work", but after that his scientific reputation and employability were diminished.[83] At one point, in exasperation, Fletcher confided to Hopkins that "I often think that Mann is not quite sane. He is so straightforward and businesslike when actually engaged on a piece of work, but so hopelessly illogical and difficult in all his private affairs".[84]

Despite the problems associated with Corry Mann's role at the MRC and modern day questioning of the validity of his results, his work undoubtedly did have a major impact in the late 1920s and 1930s. George Newman, the Chief

Medical Officer of both the Board of Education and the Ministry of Health, made favorable mentions of it in the context of a wish to encourage an increased consumption of milk.[85] Corry Mann was also extensively quoted by the NMPC (National Milk Publicity Council) in their leafleting of parents, for instance in their rather striking graphics purporting to show the effect of milk upon boys' growth.[86] In short, his work was timely and it provided welcome ammunition for those who wished to propagate milk in schools.[87] The year of the publication of Corry Mann's results (1926) was the same year as the beginning of a new milk-feeding research project by John Boyd Orr. We will encounter this later, but it is worth pointing out at this stage that Boyd Orr was a clever networker who, unlike Corry Mann, managed to make direct connections with politicians and influence legislation.

The NMPC's School Milk Schemes

For over a decade, the leading organization concerned with school milk experiments in England and Wales was the NMPC. It had been founded in 1920 as a joint enterprise between producers and distributors, with a small and somewhat cosmetic involvement by Medical Officers and Sanitary Inspectors.[88] Its very clear objective was to sell more milk, by publicity campaigns providing information about dairy products and seeking to improve their image with the general public.

One of the Council's first initiatives, in 1922, was feeding thirty under-nourished children (fifteen boys, fifteen girls) in one Birmingham school, Allcock Street Council School, with one pint of milk each per day for four months.[89] They were also fed biscuits, as were a control group of normally nourished children who received no milk.[90] The claim was that:

> There was an improvement in the rate of increase in weight and nutrition, as calculated by different methods of investigation; a notable improvement in mental and bodily vigor and alertness; and an improvement in the amount of the red coloring matter of the blood.[91]

This was a very small experiment but it drew credibility from the speedy publication of its results in a major periodical, the *Journal of the Royal Sanitary Institute* and also in pamphlet form by the NMPC itself.[92]

Similar trials were held in London (1923) and Rochester (1924), with subsequent claims that milk-fed children were more alert and energetic as a result of their supplementary diet.[93] Data such as those presented in Table 3 were taken uncritically by many observers to be conclusive, although, to a modern observer, the sponsorship by the NMPC and provision of free milk by local dairy companies would suggest a lack of scientific independence. The minutes of the Council of the NMPC indicate bluntly that the exercise was mounted "with the hope of getting some cheap publicity".[94]

< Table 3 here >

Emboldened by their successful effort in Birmingham, the NMPC approached the Board of Education in August 1923. Their delegation informed the Board that:

> The Council are anxious to conduct a great educational campaign to further their ends and they consider that the Board of Education could afford much help by means of the schools throughout the country.[95]

"In order to demonstrate the truth of their contention" the Council stated that they were prepared to carry out experiments on a large scale in English schools and would supply, for a period, milk bottles, straws and biscuits at no expense to public funds. They suggested exhibiting special films imported from America in order to persuade teachers and School Inspectors.[96] They also asked whether it would be possible for outside lecturers or organizers to be admitted to schools but were informed that "this is a difficult matter and is generally not countenanced by the Board as it would be difficult to discriminate between various types of propagandists".[97] In response, the Board of Education's line was that they were generally sympathetic towards such experiments but

declined to circularize LEAs or bring pressure to bear upon them, “as it is usual to leave the details of the school curriculum to the discretion of the Authorities themselves”.[98]

Rebuffed at the national level, the NMPC began approaching individual Local Authorities for access to schools. In the case of London, they were denied this but continued to press.[99] The first breakthrough came in February 1924 when a general publicity drive on milk in Eastbourne included some lectures to school children.[100] Eventually, in 1927, the LCC were persuaded to circulate printed propaganda about milk consumption to 800,000 of the capital’s school children.[101] This was a remarkable coup, to be given access to such a large number of potential consumers.

In 1928 the NMPC were clearly confident of an eventual nationwide roll-out because they decided to issue a special bottle of a standardized design and size, specifically for the use of school milk clubs.[102] One third of a pint was chosen as the appropriate size, since it was thought that children could not comfortably drink more than that during their morning break, the usual time for dispensing the milk. Hitherto it had been delivered to schools loose in churns and given to each child in a glass. The introduction of a small, child-friendly bottle was an important moment because, apart from its convenience for traders and teachers alike, and its hygienic qualities, it was also symbolic of an entirely new departure in the milk trade.[103] After some thought, the Council decided against printing their name on these bottles.[104] The advertisement value would have been incalculable but they felt that they “would be under some moral obligation regarding the quality of the supply”, not a risk they were prepared to take in this era of dirty and diseased milk. Instead, bottles, to begin with at least, were controlled by the NMPC but the special permission of the Board of Trade was needed because milk was not scheduled as an article that might be sold in a “pre-packaged package”.[105]

Also in 1928, the NMPC formed a School Milk Sub-Committee, comprising Henry Kenwood (Professor of Hygiene and Public Health, University of London), Wilfred Buckley (a gentleman farmer and active campaigner for clean milk), and P.B. Tustin of United Dairies.[106] This was preparatory to the

nationwide launch, in 1929, of its most audacious initiative yet to boost sales to children, the MISS (Milk in Schools Scheme). In this they offered to supply milk at a uniform price of 1d per bottle all the year round.[107] Birmingham (from 1927) and Liverpool (1928) had been piloting the MISS and the LCC soon decided to allow it in London, wherever head teachers approved.[108] This was certainly not a philanthropic gesture on the part of the milk trade because, at 1d per bottle, it was charging, pro rata, the normal retail price; however there seems to be no doubt that it did satisfy a latent demand. In the first full year of operation about 350,000 children (Table 4) were sold their daily one-third pint bottles through milk clubs under the auspices of eighty LEAs, rising to a million children in 250 Authorities in 1933 (out of the 317 in England and Wales), receiving a total of 8.5 million gallons.[109]

< Table 4 here >

In order to start a Milk Club, a head teacher had to get in touch with the NMPC, who then sent a batch of explanatory fliers for the teachers and school managers, and offered to supply sufficient leaflets of two kinds for all of the children in the school to take home. One of these was a consent form for the parent to fill in.[110] Relevant leaflets which have survived include the Council's own "Milk in Schools. A Milk Service Scheme", and the EMB's (Empire Marketing Board) "What Milk Can Do".[111] Both quoted extensively from Corry Mann's work as a justification for milk consumption by school children.

An important turning point was reached in April 1930, during the second Labour administration.[112] As a result of a meeting between the President of the Board of Education and the Agriculture Committee of the Parliamentary Labour Party, it was agreed that a circular would be issued instructing His Majesty's Inspectors of Schools to commend the NMPC scheme to LEAs or their Directors, reminding them that expenditure qualified for a fifty per cent government grant.[113] Thus the MISS became, in effect, a government-approved project and its credibility soared in the education community, to the extent that many LEAs contemplated extending their own schemes. In 1930

sixty-four Authorities provided 35,000 children with free school milk under Sections 82-84 of the Education Act (1921) and 48,000 at a reduced rate (Table 1).[114] By 1932 this had increased to a total of 120,000 children in ninety-one LEAs, and in 1934 to 180,000.[115]

The ten million extra gallons of milk sold in 1934 under the MISS was a fillip to the dairy industry, pumping £1 million a year into an industry that was otherwise suffering from economic stagnation. In addition, about 1.6 million gallons went to children under the Education Acts and seven million gallons through Mother and Child Welfare clinics.[116] In summary of this section, it is plain that the economic push factor was uppermost in the spread of school milk up to 1934, although this happened to suit the needs of many children and most LEAs were happy to oblige with the provision of facilities because for them it was cheaper to supply, often as an alternative, rather than as a supplement, to dinners.

Further Milk-Feeding Research

1926 was a pivotal year in the early history of school milk in Britain. As we have seen, the Corry Mann study was published, to acclaim by the Chief Medical Officer and others. This was also the year that Walter Elliot was appointed to the Empire Marketing Board and began his long association with school milk policy-making. Elliot was at the time Parliamentary Secretary for Health in Scotland, with a direct personal interest in the links between diet and health as a result of his medical training and his part-time research into nutrition at the Rowett Research Institute, Aberdeen. The latter had arisen as a result of his friendship with the Institute's Director, John Boyd Orr, and it was Boyd Orr who was to be one of Elliot's principal political muses over the next decade.

As Chairman of the EMB's Research Grants Committee, one of Elliot's first actions was to oversee the award £4,250 for the "utilization and marketing of dairy products, including the feeding of milk to school children in Scotland, and a survey of the literature relating to the utilization of milk residues".[117] This was an award to his own department. The original plan for the school feeding experiment had been drawn up by the Scottish National Milk and Health

Association, the Chairman of whose Research Committee was John Boyd Orr.[118] The first year of the experiment (1926/7) was directed jointly by Boyd Orr and Dr Lewis Cruickshank, a Medical Officer in the Scottish Board of Health, and, in its second phase (1927/8), in Boyd Orr's absence overseas, by Dr Gerald Leighton, also of the SBH.[119] The purpose of the investigation was "to determine whether the results shown in the American and English tests would obtain also in children attending elementary day schools, whose diet was that of the ordinary working class household".[120]

The 1,425 children involved lived in Aberdeen, Belfast, Dundee, Edinburgh, Glasgow, Greenock and Peterhead. Those aged six to seven were given three-quarters of a pint of milk per day, and the nine to ten and thirteen to fourteen olds one pint each. Some were given whole milk and others separated milk, and there was also a group receiving biscuits only and a control group limited to their customary diet.

Boyd Orr's conclusions, later confirmed by Leighton, were that the nutritional status of school children of all ages was improved by the milk diet, in both weight and height, and that separated milk was also of value.[121] Although in hindsight we can see that there were issues about his judgment of "good" or "bad" nourishment, Boyd Orr nevertheless claimed that his own work, along with that of Corry Mann and workers in America, was so momentous that "the only conclusion possible is that they [the results] have a wide public health significance, especially with the nutrition of school-children".[122]

This Scottish research was well received by the medical establishment.[123] So impressed was the EMB that it gave another grant in 1930, of £5,000 for a larger survey in Lanarkshire schools.[124] This follow-up study was needed partly to redress the possible statistical criticism of Boyd Orr's work:

> that the striking improvement in nutrition of the children who received the additional ration of milk was due not to the milk alone but in some measure to improved home conditions – food, sleep, and regulation of

life – which might follow from the close surveillance which was kept over the children under test.[125]

The arrangements were made by the Department of Health for Scotland and carried out by the Lanarkshire Education Authority, with Dr John Macintyre, its Chief Medical Officer, in executive charge. There were 20,000 children involved from sixty-seven schools, of whom 10,000 received milk.[126] The children were selected either by lot or alphabetically, in order to eliminate a possible bias of well-fed or undernourished children. Five doctors and seventeen nurses were employed full-time to take measurements.

In qualitative terms the results were presented in a positive light. The milk supplements were said to have had "a striking effect in improving physique and general health and increasing mental alertness" and to have enabled "the other constituents of the ordinary diet to be fully utilized as growth factors".[127] When asked about the effect upon the children, teachers spoke of "an increase in the bloom of their cheeks and the sleekness of their skins".[128] Quantitatively, the study was also portrayed by Leighton and McKinlay as being conclusive. There was said to be a definite increase in the rate of growth both in height and weight of both boys and girls, irrespective of age, whether they were given raw or pasteurized milk (Table 5).[129] The level of confidence in such a statement was soon called into question, however, when a number of statisticians in 1931 pointed out that the sample of children had not been properly randomized and that children in the same school should have been divided into two groups rather than whole schools drinking either raw or pasteurized milk.[130]

< Table 5 here >

Elliot was impressed by the early research on the nutritional impact of feeding milk on Scottish school children. As a Scottish MP, and newly in opposition, in November 1929 he introduced the Education (Scotland) Bill into the House of Commons as a private member, with a view to allowing Scottish LEAs to provide free or subsidized school milk.[131] In effect, he wished to

amend Section 6 of the Education (Scotland) Act (1908), which, on adoption, required LEAs to arrange food for *all* necessitous children, "where the parent was proved to be absolutely negligent in the care of the health of the child"[132] and where "the necessities of the case will not be provided for by a voluntary agency".[133] In England and Wales, LEAs were also liable, but when they adopted the Education Act (1921) there was greater leeway in the degree of help that they were required to give.[134] In the words of one civil servant, "they need do no more than they like".[135] Elliot's Bill sought to simplify the Scottish procedure, and bring it more in line with practice in England and Wales.[136]

The Bill became law in 1930 and stimulated interest in Westminster amongst those who wanted an expansion of the provision of free milk everywhere. In December of that year George Dallas, a Labour MP who took a particular interest in agricultural matters, notified Sir Charles Trevelyan, President of the Board of Education, of his intention to introduce a similar measure for England and Wales into the House of Commons, no doubt because its sole object was to promote school milk, as opposed to the Education Acts which dealt with school meals generally.[137] The reply that there was no need for such legislation did not satisfy Dallas, who then pressed the Agriculture Committee of the Parliamentary Labour Party to send a delegation to the offices of the Board.[138] This they did in April 1930 but there was no progress.[139] The Board was wary of any further legislation that might increase its financial liability to fund what it regarded as welfare rather than education. One view, for instance, of the joint memorandum on the Act issued by the Scottish Education Department and the Department of Health for Scotland, was that the Board should reject "this highly Socialistic document".[140]

In the event, the Education (Scotland) Act (1930) made little impact.[141] The Standing Committee on Scottish Bills inserted a clause that the milk provided should be Certified.[142] This was in line with the strong belief in Scotland that graded milk was preferable to pasteurized milk as a safeguard against tuberculosis, but it greatly increased costs and the scheme did not take off. By August 1933 only two LEAs had school milk schemes under the Act and even these were half-hearted. Selkirk was providing one pint a day to 48

children and the West Lothian supply to 150 children had by then already been discontinued.[143]

Discussion

In 1930 the Board of Education, in a memo to its Inspectors, declared that "there can be no doubt of the benefit of an additional daily ration of milk to all children, rural as well as urban and normal as well as delicate".[144] However, despite this statement, rural districts did not participate to the same extent as the towns.[145] Throughout the 1920s London dominated the school milk effort and the NMPC's campaign started at the top of the urban hierarchy, for the simple reason that their marketing machine could operate most cost effectively in large centers of demand. Sparsely populated areas, remote parts of the countryside, and regions specializing in arable rather than livestock agriculture, would all have had logistical problems in sourcing milk at the right price, and the high adoption rate by 1932 of the NMPC scheme by the counties in Table 6 does not mean that all rural schools were covered.

< Table 6 here >

In addition to these supply-side issues, there were spatial variations in the adoption of the scheme by schools and by parents and their children. Since the MISS was not imposed by any LEA before 1934, its spread was patchy.[146] In some areas there were objections to raw milk being served because of the danger of disease; in others pasteurized milk was equally unacceptable. Labour Councils were generally more enthusiastic than those run by other parties, but in the depressed industrial areas even minimal administrative costs were hard to bear.[147] John Welshman has suggested for Leicester that the local feeling was that the responsibility for "feeding" was a voluntary matter, and no doubt this was shared elsewhere.[148] The deepest regional division seems to have been between England and Wales on the one hand and Scotland on the other. While Scottish researchers produced a valuable series of experimental results on diet and school feeding in the 1920s and 1930s, and politicians north

of the border were active in promoting school milk, the implementation was more advanced in England and Wales. A Scottish National Milk and Health Association operated from 1924 to 1931 but the MISS was not extended there until October 1934 and publicity about milk north of the border was very low key.[149]

The Board of Education at first had reservations about school feeding in general because they saw it as a form of social service and therefore beyond their mandate. Behind this argument about the limits of financial commitment lay a prejudice against the assumed fecklessness of the poor that had its roots deep in the Victorian values of independence and self-help. Later, in the 1940s and 1950s, school meals would come to represent a restructuring of the state, whose boundaries of responsibility would now impinge increasingly upon the formerly exclusively parental realm of child welfare.[150] This became a means of capturing and recreating key areas of citizenship. In the Foucaultian sense, progressively more and more aspects of school children's non-educational lives came under the gaze and discipline of the state.

The Board of Education capped its expenditure on school meals in 1922, at a time of government retrenchment in the aftermath of labor disputes in the coal industry.[151] But it continued to promote instruction about the food value of milk in elementary and secondary schools, and, in its revised syllabus of 1919, trainee teachers encountered references to the "welfare of infants and young children and the importance of a good supply of pure milk and the danger of its contamination".[152]

What then of the steady adoption of school milk in the period 1900-1934? Was it a trend that benefited everyone, from the producers to the drinkers? At a superficial level the answer would be yes, but a closer scrutiny reveals three serious problems.

The first, and perhaps the most unexpected and damaging development was the use of milk by Local Authorities as a cheap substitute for solid school meals.[153] The Board of Education noted this trend in 1929: "in the distressed mining areas in South Wales, milk has almost completely replaced ordinary (school) meals, and the practice is growing…in other areas".[154] By November

1930 half of all school meals provided by LEAs were now milk and in 1934/5 61.9 per cent.[155] Celia Petty estimates that there would have been a fall of twenty-four per cent in the energy and nineteen per cent in the protein provided by each meal where milk replaced a conventional school dinner.[156] The cost per calorie was twice as much for milk, so the lower unit charge for a milk meal was an illusion in terms of nutritional efficiency. Overall then, the introduction of school milk was nutritionally retrograde in some areas.

Second, although the millions of additional gallons of milk sold to schools in the late 1920s and early 1930s were welcome, in truth this outlet had little impact upon the overall prosperity of milk producers. In fact, so parlous was the state of the dairy industry in 1934 that a special Milk Bill was brought in with the aim of giving it state assistance on several fronts.[157] The Act that followed took up the concept of school milk popularized by the NMPC and transformed it into a state-sponsored, nationwide program, also known as the Milk in Schools Scheme.[158] Only from the end of our period, then, did school milk have a decisive economic impact, especially from 1941 when the policy was extended in wartime conditions and from 1945 when it was made free, ushering in the phase in its history remembered by the baby boomers. According to Richard Titmuss, the provision of meals and milk at school "expressed something very close to a revolution in the attitude of parents, teachers and children to a scheme which, only a few years earlier, had not been regarded with much respect or sympathy".[159]

Third, by 1934 the ease and attractiveness of milk-drinking in the school environment had been proven but it is questionable whether a new generation of consumers had been created. In England and Wales, where only 20 per cent of elementary school pupils had been reached on a regular basis, with a further four per cent who received free milk under the Education Act, this was hardly a revolution in taste.

Conclusion

In the light of the evidence presented in this paper, we may now revisit some of the comments made in the introduction. The following conclusions constitute a revisionist interpretation of the role of school milk in this early period.

First, school milk did indeed play a small symbolic role in the way British society rethought the nature of its social welfare provision but, in assessing this, care is needed to separate several strands of evidence. School feeding as a whole gradually enabled a new vocabulary of the involvement of public services in providing for the needy but we must question whether this achieved anything in reality. It is true, for instance, that the image of milk was enhanced in the two decades prior to 1934 by more hygienic production and by the increased use of pasteurization; together these reduced the risk of infection.[160] In addition, the identification of milk as a rich source of vitamins and minerals, and its association in the work of Corry Mann and others with healthy growth in children, made it attractive as a potential meal item in schools. But it is doubtful that the availability of school milk itself played much part in this, associated as it was in the minds of many people with the stigma of free meals under the Education Act. The strongest symbolic relationship between school milk and purposive state provision was delayed until the late 1930s and wartime, and did not find its fullest flowering until after 1945.

In our period the hard economic logic of school milk was also always stronger than any conceptual re-centring towards social welfare in the sense of an anti-poverty drive. Thus the politicians who spotted the popularity of voluntary schemes in the 1920s, and in 1934 launched a government Milk in Schools Scheme, did so as part of legislation whose aim was mainly concerned with the viability of the dairy industry.

Second, consonant with the consensus that I identified in the first paragraph, it does seem reasonable to argue for a symbolism of school feeding as a whole representing a new mode of governmentality. Its provision can be seen in effect as a large experiment in social engineering, although we should remember that the following words of Frederick Le Gros Clark were made in the light of the expansion of the school meals program during the Second World War:

> The [school meals] service has now two main educational functions to perform. It has to establish in the community, over the course of a generation or two, a thoroughly flexible and wholesome set of food habits; and it has to initiate children into a social life that will, I believe, be far more rich and complex than any we knew in the past…The school meal…is an initiation in terms of one of the social processes to which he [sic] is most accustomed. We cannot make the child tolerant, self-reliant and easy mannered in the abstract; we have to choose some medium through which these qualities can be imparted to him. For such a purpose the meal table is ideal…It has become in every sense part of the educational system of the country.[161]

Taking this further, James Vernon's essay on the "techno-politics" of school meals uses the social theory of Gilles Deleuze to argue that "the school meal can be seen less as an outcome of social democracy and the welfare state than as partly constitutive of them".[162] School feeding, in this view, was representative of a new mentality of governance that saw the dispersal to the local level of agency through many streams of expertise, including the identification and monitoring of "necessitous" children. School feeding (including milk) became widespread because of the growing belief that hunger undermined social cohesion and provided an immediate ethical challenge. Catherine Burke adds that eventually education authorities decided to invest in kitchens and dining rooms in order to solidify in architectural terms their permanent commitment to this controlled environment and feeding routine, and therefore we can see the school as an "edible landscape".[163]

But can we say the same for milk up to 1934? Probably not. The arrangements of milk clubs were informal in the period up to 1934 and did not constitute the universal regimentation that many of us experienced with school milk in the 1950s and 1960s. No capital investment was necessary for milk, as for kitchens and dining halls, other than expenditure on glasses in the period before the introduction of bottles. Where Burke is more relevant for us is her conclusion that, given the resistances to the expense and quality of institutional

food throughout the period from both parents and children, the meal may be seen as a site of contested desires. This certainly was true of school milk also.

Third, the conclusion that fits the evidence most closely is that school milk did not made any substantial contribution to child welfare in the period 1900-1934.[164] By 1934 milk represented approximately sixty-two per cent of the "meals" provided in English and Welsh schools and twenty-four per cent of the total energy delivered.[165] Yet the nutritional impact was minimal or even negative in the late 1920s and 1930s, because it was used by some LEAs as a cheap substitute for solid meals.[166] Such an apparently counter-intuitive conclusion serves at least to remind us that any account that ignores the twists and turns of policy formation and implementation will be unsatisfactory. Further complications are to be found in the significant spatial variations of provision and in our doubts that children were trained to be the consumers of the future.

Fourth, maybe the true significance of school milk lies in its switch from being a voluntary commercial initiative of the NMPC to being caught up in the restructuring of state power over the food economy that was debated in the early 1930s and implemented from 1933.[167] In John Pickstone's terms this was a move from "productionist" to "communitarian" concerns with health and welfare.[168] In turn, this was the result of the increasingly corporatist tinge of National Government politics and patterns of globalized trade and economic depression that forced the Ottawa agreements of 1932. Under the latter, Britain tried to reforge its relationship with the Dominions by agreeing to its market remaining open to imperial produce, including butter and cheese.[169] The Milk Act of 1934, one result of which was the absorption of the NMPC scheme into an expanded and state-organized Milk in Schools Scheme, was a means of compensating home farmers for the sacrifice implicit in officially sanctioned cheap imports. School milk had entered the realm of high politics as a pawn in a game with stakes much higher than had ever been envisaged at the outset in 1906.

Notes

[1] My thanks are due to five anonymous referees who made very thorough, helpful suggestions.

[2] But Virginia Berridge has called this interpretation "inadequate", first because the Liberal reforms were a continuation of Victorian ideas and, second, because motivations for change transcended any simple notions of welfare. V. Berridge, "Health and medicine", in F.M.L. Thompson, ed., *The Cambridge social history of Britain 1750-1950, volume 3: social agencies and institutions* (Cambridge, 1990): 171-242.

[3] Bentley Gilbert, *The evolution of national insurance in Great Britain: the origins of the welfare state* (London, 1966): 102.

[4] Bernard Harris, *The origins of the British welfare state: social welfare in England and Wales, 1800-1945* (Basingstoke, 2004): 158.

[5] Pat Thane, *Foundations of the welfare state* (2nd edition, London, 1996): 70; Charles Webster, "Government policy on school meals and welfare foods 1939-1970", in D.F. Smith, ed., *Nutrition in Britain: science, scientists and politics in the twentieth century* (London, 1997): 190-213. Webster adds that the 1906 Act built these foundations "somewhat inadvertently".

[6] Ulla Gustafsson, "School meals policy: the problem with governing children", *Social Policy & Administration*, 36 (2002): 685-97.

[7] Bentley Gilbert, "Health and politics: the British physical deterioration report of 1904", *Bulletin of the History of Medicine*, 39 (1965): 143-53.

[8] "Report of the Royal Commission on Physical Training (Scotland)", *Parliamentary Papers* 1903 (Cd 1507, 1508) xxx.1; "Report of the Inter-Departmental Committee on Physical Deterioration", *Parliamentary Papers* 1904 (Cd 2175, 2210, 2186) xxxii.1; "Report of the Inter-Departmental Committee on Medical Inspection and Feeding of Children Attending Public Elementary Schools", *Parliamentary Papers* 1906 (Cd 2779, 2784) xlvii.1.

[9] Welshman, "School meals", 9 notes that there was widespread opposition to school meals.

[10] Education (Provision of Meals) Act (1906) 6 Edw 7 cap 57; Education (Provision of Meals) Act (1914) 4&5 Geo 5 cap 20; and Education (Consolidation) Act (1921) Act 11&12 Geo 5 cap 68. All three Acts were "permissive" in the sense that LEAs were not obliged to adopt them. For further discussion of the 1906 Act and its background, see John Stewart, "Ramsay MacDonald, the Labour Party, and child welfare, 1900-1914, *Twentieth Century British History*, 4, 105-25; Thane, "Foundations", 65, 70-71; John Stewart, "'This injurious measure': Scotland and the 1906 Education (Provision of Meals) Act", *Scottish Historical Review*, 78, 76-94; and Harry Hendrick, *Child welfare: historical dimensions, contemporary debate* (Bristol, 2003): 70-73. Note that the 1914 Act removed limits on expenditure and introduced the progressive policy that LEA spending would be matched by Treasury grants.

[11] Anne Colquhoun, Phil Lyon and Emily Alexander, "Feeding minds and bodies: the Edwardian context of school meals", *Nutrition & Food Science*, 31 (2001): 117-24.

[12] Bernard Harris, *The health of the schoolchild: a history of the school medical service in England and Wales* (Buckingham, 1995): ch. 7.

[13] Ibid., 125.

[14] Ulla Gustafsson, "The privatization of risk in school meals policies", *Health, Risk & Society*, 6 (2004): 53-65.

[15] Gustafsson, "The privatization of risk".

[16] "Protective", in the sense of a nutritional barrier against disease, was first used in Elmer McCollum, *The newer knowledge of nutrition* (New York, 1919).

[17] Peter Atkins, "White poison: the health consequences of milk consumption, 1850-1930", *Social History of Medicine,* 5 (1992): 207-27.

[18] Idem., "The Milk in Schools Scheme, 1934-45: 'nationalization' and resistance", *History of Education*, 34 (2005): 1-21.

[19] John Welshman, "The school medical service in England and Wales, 1907-1939" (DPhil. thesis, Oxford, 1988): ch. 4; Idem., "School meals and milk in England and Wales, 1906-45", *Medical History* 41 (1997): 6-29.

[20] Harris, “The health of the schoolchild”, ch. 7.

[21] Charles Webster, “Health, welfare and unemployment in the Depression”, *Past and Present* 109 (1985): 204-230.

[22] John Hurt, “Feeding the hungry schoolchild in the first half of the twentieth century”, in Derek Oddy and Derek Miller, eds, *Diet and health in modern Britain* (London, 1985): 178-206; Deborah Dwork, *War is good for babies and other young children: a history of the infant and child welfare movement in England, 1898-1918* (London, 1987): ch. 4; John Burnett, “The rise and decline of school meals in Britain, 1860-1990”, in John Burnett and Derek Oddy, eds, *The origins and development of food policies in Europe* (London, 1994): 55-69.

[23] John Macnicol, *The movement for family allowances, 1918-45: a study in social policy development* (London, 1980): 65-66; Charles Webster, “Saving children during the depression: Britain’s silent emergency, 1919-1939”, *Disasters*, 18 (1994): 213-20; Atkins, “Fattening children”. See also: Lee Gilbert, “The history of school milk: an economic and marketing solution” (MA thesis, University of East Anglia, 1999). I am grateful to Professor Roger Cooter for a sight of this thesis.

[24] For the period immediately after, see Atkins, “The Milk in Schools Scheme, 1934-45”. The National Government was a coalition of Labour, Liberal and Conservative politicians initiated during the national financial crisis of 1931. It lasted until 1940.

[25] John Hurt, *Elementary schooling and the working classes, 1860-1918* (London, 1979): Chapter 5; Hendrick, “Child welfare”, 66-70.

[26] Evidence of Dr Alfred Eichholz, “Report of the inter-departmental committee on physical deterioration: Vol. II: Lists of witnesses and minutes of evidence”, *Parliamentary Papers* 1904 (Cd 2210) xxxii.176, Q. 476.

[27] The practical importance of vitamins remained a matter of contestation throughout the 1920s. Boyd Orr at the Rowett Research Institute, for instance, emphasised minerals rather than vitamins. David Smith, “Nutrition science and

the two world wars", in idem., ed., *Nutrition in Britain: science, scientists and politics in the twentieth century* (London, 1997): 142-65.

[28] Frederick Gowland Hopkins, "Feeding experiments illustrating the importance of accessory factors in normal dietaries", *Journal of Physiology*, 44 (1912): 425-60; Idem., "Note on the vitamine content of milk", *Biochemical Journal*, 14 (1920): 721-4. For a recent reappraisal of his work, see Harmke Kamminga and Mark Weatherall, "The making of a biochemist I: Frederick Gowland Hopkins' construction of dynamic biochemistry", *Medical History*, 40 (1996): 269-92.

[29] Harmke Kamminga,"'Axes to grind': popularizing the science of vitamins, 1920s and 1930s", in David Smith and Jim Phillips, eds, *Food, science, policy and regulation in the twentieth century: international and comparative perspectives* (London, 2000): 83-100.

[30] J.M. Hamill, "Diet in relation to normal nutrition", *Reports on Public Health and Medical Subjects, Food Series*, no. 1 (London, 1921): 29.

[31] Jane Lewis, *The politics of motherhood: child and maternal welfare in England, 1900-1939* (London, 1980): ch. 2; David Smith and Malcolm Nicolson, "The 'Glasgow School' of Paton, Findlay and Cathcart: conservative thought in chemical physiology, nutrition and public health", *Social Studies of Science*, 19 (1989): 195-238; David Smith and Malcolm Nicolson, "Health and ignorance: past and present", in Stephen Platt, Hilary Thomas, Sue Scott and Gareth Williams, eds, *Locating health: sociological and historical explorations* (Aldershot, 1993): 221-44; David Smith and Malcolm Nicolson, "Nutrition, education, ignorance and income: a twentieth century debate", in Harmke Kamminga and Andrew Cunningham, eds, *The science and culture of nutrition, 1840-1940* (Amsterdam, 1995): 288-318; Julie Taylor, Nick Spencer and Norma Baldwin, "Social, economic, and political context of parenting", *Archives of Disease in Childhood*, 82 (2000): 113–120.

[32] For further comments about milk and eugenics in the 1930s, see Peter Atkins, "The pasteurization of England: the science, culture and health implications of milk processing, 1900-1950", in David Smith and Jim Phillips,

eds, *Food, science, policy and regulation in the twentieth century: international and comparative perspectives* (London, 2000): 37-51. For a subtly modulated account of the social politics of eugenics in this period, see Greta Jones, "Eugenics and social policy between the wars", *Historical Journal*, 25 (1982): 717-28. The complexity of the relationship between science and eugenics is covered in G. Schaffer, "'Like a baby with a box of matches': British scientists and the concept of 'race' in the inter-war period", *British Journal for the History of Science*, 38 (2005): 307-24.

[33] G. Leighton and P.L. McKinlay, *Milk consumption and the growth of school children: report on an investigation in Lanarkshire schools* (Edinburgh, 1930): 3.

[34] Edith Whetham, *The agrarian history of England and Wales, volume VIII: 1914–39* (Cambridge, 1978): 250.

[35] Peter Atkins and Alessandro Stanziani, "Constructing the natural: regulation of milk standards in Britain and France, 1890-1930", unpublished MS (2006).

[36] Atkins, "White poison".

[37] Ivan Illich, *Deschooling society* (Harmondsworth, 1973): 46. For a discussion of Illich, and also of related work by Habermas and Bourdieu, see Atkins, "Fattening children", 73.

[38] Inter-Departmental Committee on Medical Inspection and Feeding of Children Attending Public Elementary Schools, volume II: "Minutes of evidence. List of witnesses, minutes of evidence, appendices and index", *Parliamentary Papers* 1906 (Cd. 2784) xlvii. q. 1420.

[39] Inter-Departmental Committee on Medical Inspection, qq. 47-49, 470, 494, 1821c.

[40] Ibid., q. 1694. His comment arose from views expressed at a "Conference on Underfed School Children" held at Toynbee Hall in June 1904. See the *Toynbee Record*, 16 (1904): 141-144. The idea was elaborated by Canon Barnett, Warden of Toynbee Hall, in evidence to the Select Committee on the Education (Provision of Meals) Bill 1906 and the Education (Provision of

Meals)(Scotland) Bill 1906, *Parliamentary Papers* 1906 (288) viii. q. 2282. Toynbee Hall, located in London's East End, was (and still is) a practical base for social service and a symbolic rallying point for thinking about poverty reduction.

[41] Inter-Departmental Committee on Medical Inspection, q. 1705.

[42] London County Council, "Report of medical officer for the year 1929", in *Annual report of the council, 1929. Volume III: public health* (London, 1931): 110; Chief Medical Officer of the Board of Education, *The health of the school child, 1923* (London, 1924). The use of cod liver oil in London was challenged by the District Auditor for the 1909-10 accounts. He claimed that it was not allowable under the 1906 Act. London County Council, "Education Committee Minutes of Proceedings, Children's Care (Central) Sub-Committee Report", 20th March 1912, 599.

[43] M.E. Bulkley, *The feeding of school children* (London, 1914): 191. Cod liver oil was a remedy for rickets. Kumaravel Rajakumar, **"**Vitamin D, Cod Liver Oil, Sunlight, and Rickets: A Historical Perspective", *Pediatrics*, 112 (2003): e132-e135.

[44] Opposition was so strong that the 1906 Act did not apply to Scotland. See Stewart, "This injurious measure".

[45] London County Council, "Report for the year 1933 of the school medical officer", in *Annual report of the council, 1933. Volume III (Part II): public health* (London, 1934).

[46] Jane Lewis, "The social history of a policy: infant welfare in Edwardian England", *Journal of Social Policy*, 9 (1980): 463-86; Dwork, "War is good for babies", ch. 4; Atkins, "White poison", 223-24.

[47] Lord Rhondda, the Food Controller, made the Milk (Mothers and Children) Order in February 1918. E.M.H. Lloyd, *Experiments in state control at the War Office and the Ministry of Food* (Oxford, 1924): 263.

[48] Although up to 1930 this was only on the personal recommendation of the MOH and where the family was poor.

[49] E.J. Maude, “Milk consumption: report dated 30 January, 1936, of an informal inter-departmental committee comprising representatives of the Ministry of Agriculture and Fisheries, Board of Education, Market Supply Committee, Ministry of Health, Department of Health for Scotland, Scottish Office and Treasury”, 9. E.M.H. Lloyd Papers, British Library of Political and Economic Science, 4/56.

[50] NA (National Archives, Kew, UK), MH 56/74.

[51] Chief Medical Officer of the Board of Education, Annual report, *Parliamentary Papers* 1921 (Cmd 1522) xi.

[52] The Board of Education’s Circular 1261 of May 17th 1922 was a policy threshold, insisting that LEAs refocus on the ill-nourished child at a time when the coal strike had meant political pressure to feed the children of the unemployed.

[53] Anon., “School health work”: “The size of a school’s milk list depends largely upon the opinion of the head teacher and care committees, and on their zeal and enthusiasm in seeking out suitable children and bringing them before the doctor as special cases”.

[54] R. Huws Jones, “Physical indices and clinical assessments of the nutrition of schoolchildren”, *Journal of the Royal Statistical Society*, 101 (1938): 1-34.

[55] In the 1930s this was convenient for government, who resisted definitions that might lead to an expansion of welfare expenditure. See Charles Webster, “Healthy or hungry thirties?” *History Workshop Journal*, 13 (1982): 110-29; Madeleine Mayhew, “The 1930s nutrition controversy”, *Journal of Contemporary History*, 23 (1988): 445-64; Harris, “The health of the schoolchild”, 130-36.

[56] 23 out of 26 local care committees in London preferred this approach. LCC, Central Care Sub-Committee, Agenda Papers, 18th January, 1924, LMA: LCC/MIN/3169.

[57] LCC, Education Committee, “Minutes of proceedings. Central Care Committee. Meeting of 2 March 1923”, 155.

[58] In 1924 there were 296 schools in London with voluntary milk clubs.

[59] Anon., School health work in London, *British Medical Journal*, ii (1924): 283.

[60] Newman to Bosworth Smith (Principal, Board of Education), 21 August 1923, NA, ED 50/79.

[61] Chief Medical Officer of the Board of Education, *The health of the school child, 1923* (London, 1924): 119. Before 1922 there had been no machinery for reviewing the nutritional status of children given milk, with the result that many remained as "necessitous" longer than clinically necessary. LCC, Central Care Sub-Committee, Agenda Papers, Joint Report by the School Medical Officer and the Education Officer, 15th February, 1924, London Metropolitan Archives (LMA): LCC/MIN/3169.

[62] Milk clubs were usually organized by teachers. They were entirely voluntary but used school premises and were regarded benignly by LEAs.

[63] Peter Atkins, "White heat in Whitehall. Inter-departmental friction and its impact upon food safety policy: the example of milk, 1930-35", paper under review (2006).

[64] Elmer McCollum, "The nutritional value of milk", in L.A. Rogers and K.D. Lenoir, eds, *Proceedings of the world's dairy congress, Washington DC, October 2, 3, Philadelphia PA, October 4, Syracuse NY, October 5, 6, 8, 9, 10, 1923* (Washington DC, 1924): Volume I, 421-37.

[65] According to Jon Pollock, this is the "Hawthorne effect". J.I. Pollock, "Two controlled trials of supplementary feeding of school children in the 1920s", The James Lind Library (www.jameslindlibrary.org), accessed 23rd March 2006.

[66] NA, FD 1/42; FD 1/3791. The rickets work was published in Harold Corry Mann, "Rickets: the relative importance of environment and diet as factors of causation: an investigation in London", *Medical Research Council, Special Report Series* no. 68 (London, 1922).

[67] NA, FD 1/3790, "Nutritive value of milk" (Corry Mann), i.

[68] For more on Corry Mann, see the Dr Barnardo's papers in the University of Liverpool Archives, D239.B3/1/5.

[69] Ministry of Health, *On the state of the public health: annual report of the chief medical officer for 1926* (London, 1927): 186.

[70] Ministry of Health, *On the state of the public health: annual report of the chief medical officer for 1927* (London, 1928): 153.

[71] E.C. Petty, "The impact of the newer knowledge on nutrition: nutrition science and nutrition policy, 1900-1939" (PhD thesis, London, 1987): 181-86; idem., "Primary research and public health: the mobilization of nutrition research in inter-war Britain", in Joan Austoker and Linda Bryder, eds, *Historical perspectives on the role of the MRC* (Oxford, 1989): 83-108.

[72] J. Cook, L.M. Irwig, S. Chinn, D.G. Altman and C.D. Florey, "The influence of availability of free school milk on the height of children in England and Scotland", *Journal of Epidemiology and Community Health*, 33 (1979): 171-176; I.A. Baker, P.C. Elwood, J. Hughes, M. Jones, F. Moore, P.M. Sweetnam, "A randomized controlled trail of the effect of the provision of free school milk on the growth of children", *Journal of Epidemiology and Community Health*, 34 (1980): 31-34; R.J. Rona and S. Chinn, "School meals, school milk and height of primary school children in England and Scotland in the eighties", *Journal of Epidemiology and Community Health*, 43 (1989): 66-71.

[73] A.S. Wiley, "Does milk make children grow? Relationships between milk consumption and height in NHANES 1999-2002", *American Journal of Human Biology*, 17 (2005): 425-41.

[74] Dr H.E. Magee perceptively wrote in his obituary of Corry Mann that he "was truly a pioneer, for he set the pattern for the conduct of investigations designed to test the practical value of foods or of single nutrients, and few of the reports published since his appeared in 1926 have failed to quote the Corry Mann experiment". *British Medical Journal*, i (1961): 1257-58. In modern terms, Corry Mann's report was a "citation classic".

[75] MacFadden to Fletcher, 4 February 1922, NA, FD 1/3790.

[76] Fletcher to Noel Paton, 24 June 1924, NA, FD 1/3791.

[77] Greenwood to MRC, 7 February 1924; Fletcher to members of MRC, April 4 1924, NA, FD 1/3790.

[78] Noel Paton to Fletcher, 4 October 1922, NA, FD 1/42.

[79] Noel Paton to Fletcher, 25 June and 8 July 1924, NA, FD 1/3791.

[80] Smith and Nicolson, "The 'Glasgow School'".

[81] Fletcher to Corry Mann, 20 March 1923; 5 February 1924, NA, FD 1/3790.

[82] Corry Mann to Fletcher, 16 June 1925, NA, FD 1/3791. He claimed that "Professor Hopkins had on more than one occasion assured me of the permanence of service with the council". Corry Mann to Fletcher, 31 January 1926, NA, FD 1/3791.

[83] Mellanby to Fletcher, 20 June 1927, NA, FD 1/3792.

[84] Fletcher to Hopkins, 20 June 1927, NA, FD 1/3792.

[85] Chief Medical Officer of the Board of Education, *The health of the school child, 1926* (London, 1927): 186; ibid., 1927, 153.

[86] The National Archives have many of the original NMPC leaflets. NA, ED/50/79.

[87] In addition, Corry Mann has significance in the early history of controlled feeding trials. Pollock, "Two controlled trials".

[88] Alan Jenkins, *Drinka pinta: the story of milk and the industry that serves it* (London, 1970): 80-82.

[89] *The Milk Industry*, 3, 6 (December 1922): 58; NA, ED50/79.

[90] Chief Medical Officer of the Board of Education, *The health of the school child, 1922* (London, 1923): 118-19.

[91] G.A. Auden, *A notable experiment in the feeding of children* (London, 1923): 2.

[92] G.A. Auden, "An experiment in the nutritive value of an extra milk ration", *Journal of the Royal Sanitary Institute*, 44 (1923): 236-47.

[93] Chief Medical Officer of the Board of Education, *The health of the school child, 1923* (London, 1924).

[94] NMPC Minutes, August 1922, cited in Gilbert, "The history of school milk", 15.

[95] "Memo of interview", 9th August 1923, NA, ED 50/79.

[96] Ibid.. School milk programs were already underway in Baltimore and California, where “every child in school is supplied with milk during school hours which is drunk from special bottles by means of straws, the supply being free in the case of children whose parents are not in a position to pay”. In the event, the NMPC did use film as a key means of propaganda, but they employed cinema vans and church halls as a means of targeting otherwise hard to reach consumers rather than trying to persuade the education industry.

[97] Ibid..

[98] Ibid..

[99] NMPC minutes, 9 September and 11 November 1924, NA, MAF 52/7, TD/428.

[100] NMPC minutes, 11 March 1924, NA, MAF 52/7, TD/428.

[101] Jenkins, “Drinka pinta”, 97.

[102] NMPC minutes, 23 October 1928, NA, MAF 52/7, TD/428A.

[103] A quotation was accepted from the United Glass Bottle Manufacturers Ltd to produce this bottle in the first instance. NMPC minutes, 27 November 1928, NA, MAF 52/7, TD/428A.

[104] NMPC minutes, 27 November 1928, NA, MAF 52/7, TD/428A.

[105] NMPC Advertising and Publicity Committee minutes, 11 February 1929, NA, MAF 52/7, TD/428A.

[106] NMPC minutes, 27 November 1928, NA, MAF 52/7, TD/428A.

[107] London County Council, *Report of the school medical officer for the year 1929* (London, 1930). It is clear that some sections of the trade saw this scheme in a cynical light because that year twelve per cent of school milk samples were found to be adulterated.

[108] London County Council, “Report of medical officer for the year 1929”, in *Annual report of the Council, 1929. Volume III: public health* (London, 1931): 110.

[109] Chief Medical Officer of the Board of Education, *The health of the school child, 1933* (London, 1934): 28; *Parliamentary Debates,* 280 (1933), c. 658; Jenkins, “Drinka pinta”, 104.

[110] "Milk schemes in schools", NA, ED 50/79.

[111] The Empire Marketing Board was set up in 1926 to promote imperial products. See Peter Atkins, "The Empire Marketing Board", in Derek Oddy and Lydia Petráňová, eds, *The diffusion of food culture in Europe from the late eighteenth century to the present day* (Prague, 2005): 248-55.

[112] The first two Labour administrations (1924 and 1929-31) were both short-lived, minority governments.

[113] "*Memo to Inspectors,* E. No 309", 23 July 1930, NA, ED 50/79.

[114] *Parliamentary Debates,* 244 (1930), cc. 1863-64; 245 (1930), cc. 1814-15.

[115] *Parliamentary Debates,* 273 (1932), cc. 764-65; Stocks to Howarth, 1 March 1934, NA, ED 50/81.

[116] In 1931/2 the Education Act milk was available in 81 Local Education Authorities, so, by subtraction, 228 were not participating. Under this scheme 46,500 children were provided with free milk and 47,600 paid, representing a total of 2.0 per cent of all pupils. The National Government encouraged an expansion of the free milk and by December 1934 the number of children receiving it had increased to 200,000. NA, ED 24/1367.

[117] Empire Marketing Board, *A year's progress* (London, 1927).

[118] For more on the SNMHA, see Jacqueline Jenkinson, *Scotland's health 1919-1948* (Oxford, 2002): 239-42.

[119] The experimental records at the Rowett show that W. Godden and J.I.M. Ironside began work in 1926 "to determine the composition of whole and separated milk as used in the school children supplementary feeding experiment". Rowett Research Institute Archives, RRI 30/1.

[120] *Tenth annual report of the Scottish Board of Health, 1928* (Edinburgh).

[121] J.B. Orr, "Milk consumption and the growth of school children", *Lancet,* i (1928): 140-41 and 202-03; J.B. Orr, G. Leighton, Sir L. Mackenzie and M.L. Clark, "Milk consumption and the growth of school children", in *World's Dairy Congress – 1928: report of proceedings, Great Britain, June 26th-July12th*

(London, 1928): 778-786; J.B. Orr and G. Leighton, “Scottish milk-feeding investigation in schools”, *Journal of State Medicine*, 37 (1929): 524-47; G. Leighton and M.L. Clark, “Milk consumption and the growth of school children: second preliminary report on tests to the Scottish Board of Health”, *Lancet*, i (1929): 40-43.

[122] Leighton and Clark, “Milk consumption”.

[123] Anon., “The dietetic value of milk and milk products”, *Lancet*, i (1928): 193-4; Anon., “The virtues of milk”, *Lancet*, i (1929): 28-29.

[124] *Parliamentary Debates*, 235 (1930), c. 634. A further £2,500 came from the Central Advisory Committee of the Distress in Mining Areas (Scotland) Fund and from private donations. Jenkinson, “Scotland’s health”, 245-48.

[125] Leighton and McKinlay, “Milk consumption”, 2.

[126] For further details, see Pollock, “Two controlled trials”.

[127] Leighton and McKinlay, “Milk consumption”, 3.

[128] Ibid., 11.

[129] Ibid., 20. The interest in raw and pasteurized milk is explained in Atkins, “The pasteurization of England”.

[130] S. Bartlett, “Nutritional value of raw and pasteurized milk”, *Journal of the Ministry of Agriculture*, 38 (1931): 60; R.A. Fisher and S. Bartlett, “Pasteurized and raw milk”, *Nature* (18 April 1931): 591-92; Student, “The Lanarkshire milk experiment”, *Biometrika,* 23 (1931): 398-406; J. Taylor, “Milk tests in Lanarkshire Schools”, *Nature* (21 March 1931): 466 and (18 April 1931): 591-92; Pollock, “Two controlled trials”.

[131] He was Conservative member for Glasgow, Kelvingrove.

[132] *Parliamentary Debates*, 232 (1929/30), c. 1222.

[133] Section 6(2) of the Act.

[134] Eaton to Pelham, 31 December 1929; Eaton to Stocks, 1 January 1930, NA, ED 50/79.

[135] Eaton to Stocks, 1 January 1930, NA, ED 50/79.

[136] Peck (Second Secretary, Scottish Education Department) to Stocks (Assistant Secretary, Treasury), 24 December 1929, NA, ED 50/79.

[137] Dallas to Trevelyan, 3 December 1929, NA, ED 50/79. Dallas was member for Wellingborough (1929-31).

[138] Trevelyan to Dallas, 7 December 1929, NA, ED 50/79.

[139] "Record of meeting between President of Board of Education and the Agriculture Committee of the P.L.P.", 8 April 1930, NA, ED 50/79.

[140] W.R. Richardson to Maudslay, 28 November 1930, NA, ED/50/79.

[141] Jenkinson, "Scotland's health", 249-50, erroneously claims it as a "pilot project" for the 1934 Milk Act, although it is true that Elliot was behind both.

[142] Certified milk had to be from tuberculin-tested cows, i.e. tuberculosis-free, and also of a high bacteriological standard. *Parliamentary Papers* 1929-30 (127) i. 753; *Parliamentary Papers* 1929-30 (76) v. 611.

[143] *British Medical Journal*, ii (1933): 272.

[144] *Memo to Inspectors* E. No 309, 23 July 1930, NA, ED 50/79.

[145] Chief Medical Officer of the Board of Education, *The health of the school child, 1935* (London, 1936).

[146] NMPC Council, 22 November 1932, NA, MAF/52/7, TD/428B.

[147] Elliot to Wood, 2 March 1936, NA, MH 79/347.

[148] John Welshman, *Municipal medicine: public health in twentieth-century Britain* (Oxford, 2000): 182.

[149] National Archives of Scotland, GD1/41/1-4.

[150] Dwork, "War is good for babies", 222, refutes Bentley Gilbert's claim that the origins British welfare state lie before 1914. She prefers to see the First World War as the hinge point. For a discussion of the similarly fundamental changes that took place in the Second World War, see Richard Titmuss, *The problems of social policy* (London, 1950): 509-13.

[151] Harris, "The health of the school child", 121-24. Expenditure on feeding may well have declined earlier if it were not for the demand created by hardship during the dispute. For the limited nature of school feeding generally in the interwar period at a time of widespread need, see Webster, "Saving children".

[152] Paper for Principal Assistant Secretaries' Committee, "Methods of co-operation with the Ministry of Health on the subject of milk", 14 June 1920, NA, MH 56/74 and ED 50/79; Board of Education, *Regulations for the training of teachers. Hygiene syllabus* (London, 1919), Section VI: "Welfare of infants and young children", NA, MH 56/74.

[153] When bottled, milk was easy to distribute to children, without the expensive preparation and washing up facilities required for dinners.

[154] Memo by S.H. Wood, 5 December 1929, NA, ED 50/79.

[155] *Parliamentary Debates,* 244 (1930), cc. 1863-64.

[156] Petty, "The impact", 169-72.

[157] For a full discussion of the economic motivations for the expansion of school milk, see Atkins, "Fattening children".

[158] Atkins, "The Milk in Schools Scheme, 1934-45".

[159] Titmuss, "The problems of social policy", 510.

[160] For more on the image of milk, see Francis McKee, "The popularization of milk as a beverage during the 1930s", in D.F. Smith, ed., *Nutrition in Britain: science, scientists and politics in the twentieth century* (London, 1997): 123-41.

[161] Frank Le Gros Clark, *Social history of the school meals service* (London, 1948).

[162] James Vernon, "The ethics of hunger and the assembly of society: the techno-politics of the school meal in Britain", *American Historical Review*, 110, 3 (2005): 32 paras, http://www.historycooperative.org/journals/ahr/110.3/vernon.html (accessed 24 March, 2006).

[163] Catherine Burke, "Contested desires: the edible landscape of school", *Paedagogica Historica*, 41 (2005): 571-87.

[164] For a similar conclusion, see Webster, "Government policy"; and Atkins, "Fattening children".

[165] The basis for making these estimates is presented in Peter Atkins, "Fattening children or fattening farmers? School milk in Britain, 1921-1941", *Economic History Review* 68 (2005): 57-78.

[166] Ibid., 64-65.

[167] For instance, the formation of the Milk Marketing Boards.

[168] John Pickstone, "Production, community and consumption: the political economy of twentieth-century medicine", in Roger Cooter and John Pickstone, eds, *Companion to medicine in the twentieth century* (London, 2003).

[169] For more on this, see Atkins, "Fattening children".