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*The emergence of Agribusiness in Europe and the development of the Western
European broiler chicken industry, 1945-73*

by Andrew Godley

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Abstract

This article presents new data on the emergence and growth of the leading West European poultry industries after 1945. It shows that those countries where poultry output grew most quickly – especially the UK, Italy and Spain – were also the countries where the agricultural sectors adopted US technologies and US agribusiness organizational structures most vigorously. Elsewhere in West Europe, poultry output grew much less quickly and the adoption of agribusiness structures lagged behind. By contrast, the poultry sector in the USSR was based on the Soviet collectivist system. This was the largest poultry sector in Europe, but also much less efficient. The article suggests therefore that the diffusion of the agribusiness type of organization of agriculture and the increase in poultry output were deeply entwined across Europe, with potentially important consequences for the different roles and impacts of agribusiness in Europe.

On 28 May 1964, the President of the Soviet Union, Nikita Khrushchev, visited the Cobb Breeding Company's stand in the British Agricultural Pavilion in the Park of Economic Achievement of the People of the USSR in Moscow. There he marveled at the genetic advances that enabled Cobb-bred broiler chickens to be so productive. Historians recently discovered that the encounter prompted Khrushchev to write a long memorandum to the Presidium of the Central Committee of the Communist Party of the Soviet Union, admonishing Soviet scientists for being insufficiently attentive to solving the problems of Soviet agriculture. Given the Cold War context, Khrushchev's rebuke was remarkable, praising the 'capitalists' of Cobb, who, by contrast, represented 'a high minded approach to poultry husbandry'.¹

The episode is revealing because Khrushchev's response to the Cobb broiler chicken was borne out of the deep crisis in Soviet farming in 1963 and 1964. While little was known about it at the time in the West, Soviet grain production suffered

during a prolonged drought in 1963, and, in the absence of feed grains, Soviet poultry meat output fell by a quarter in 1964 (see Table 1 below).² Collectivism appeared to be less successful at providing food than capitalism, and partly, according to Khrushchev's memo, because of the relative failings of Soviet science.

However, the capitalist agriculture that had produced the Cobb broiler chicken was markedly different to the capitalist organization of agriculture that had been prevalent only a few years earlier. It was Cobb, and indeed the poultry sector as a whole, according to the renowned British agricultural commentator, Geoffrey Sykes, that was responsible for introducing the term *agribusiness* into Europe.³ Agribusiness was an American term, coined to describe a critically important innovation in the organisation of food production, the rapid move to vertical integration and increasing use of technology in many areas of US agriculture in the 1950s. It was this form of capitalist agriculture that had prompted Khrushchev's admiration.

After an extended visit to Harvard in 1952, Sykes had come away impressed with the US poultry sector.⁴ While at Harvard, Sykes must have attended some early lectures by John H Davis, who created the Agribusiness programme at Harvard Business School from 1955.⁵ Davis was articulating the view that applying new technology within larger and more integrated firms held significant advantages for agricultural producers in marketing. While it was widely understood that increasing investment in technology and exploiting economies of scale led to production efficiencies, the advantages of the agribusiness model lay more in the ability it gave producers to reduce price volatility. The risks faced by small producers in selling agricultural output in spot-markets were well understood. Indeed both Soviet Collectivization and the late nineteenth-century agricultural co-operative movements in Europe can be understood partly as organizational responses to the problems of marketing perishable foods.⁶ Agribusiness was a new response to an old problem.

Agribusiness diffused throughout western Europe in the 1960s and 1970s. This coincided with the development of the EEC, and so agribusiness became a central element in the growing controversies surrounding the Common Agricultural Policy in the 1980s, on whether European policy had been captured by large corporations rather than rural societies, for example.⁷ As agribusiness organizational structures spread around Europe, it also became apparent that there were differences between countries' industrializing food supply systems.⁸ These differences in organizational structures in turn influenced the positions adopted by different EEC

nations in policy debates. Understanding the origins and development of agribusiness in Europe may therefore contribute to a better appreciation of both the evolution of food systems within Europe and their relationship with the policy debates and controversies in European agriculture over the past half century. The origins of this organizational innovation in the United States can be traced to dairying and fruit growing. But this article follows Geoffrey Sykes' observation that the birth of agribusiness in Europe was associated with the diffusion of the broiler chicken.

The article presents new data on the emergence and growth of the leading European poultry industries after 1945, and shows that those countries where poultry output grew most quickly – especially the UK, Italy and Spain – were also the countries where the agricultural sectors adopted both US technologies (like the Cobb broiler chicken) and US agribusiness organizational structures most vigorously. Elsewhere in Europe, where co-operatives remained influential, or where central wholesale markets remained important as clearing houses, poultry output grew much less quickly. The article suggests therefore that the diffusion of the agribusiness type of organization of agriculture and the increase in poultry output were, as Sykes claimed was the case for the UK, deeply entwined across Europe, with potentially important consequences for the different roles and impacts of agribusiness across European nations.

In the next section, the article returns to Khrushchev marveling at the Cobb broiler chicken in Moscow in May, 1964. While the Soviet poultry industry was then the largest in Europe by some distance, it had been dramatically overtaken by the US poultry sector, with its novel broiler chicken breeds, during the 1950s. The following section is a data-driven exercise in identifying the exact periods that broiler chicken output began to take off in western Europe. This is then followed by a discussion of the different institutional paths taken by the emerging poultry industry centres of Europe, contrasting the British agribusiness model (in Section III) with the cooperative association models that remained so influential in northern Europe (Section IV) but which saw only relatively slow growth in poultry output, before going on to consider (in Section V) a group of countries that moved from very traditional farming to agribusiness systems in poultry very quickly – it was these economies that went on to become western Europe's leading centres for poultry industry output by 1973. Section VI concludes with a discussion and suggestions for further research.

I

Khrushchev's Cobb memorandum was a footnote in the growing crisis in Soviet agricultural production, a crisis which contributed to Khrushchev being deposed and replaced by Leonid Brezhnev in October 1964. USSR poultry output was already enormous in the 1930s, and by 1961 it dominated the rest of Europe (see Table 1). Soviet poultry farming was organized around large flocks of dual-purpose birds, producing both eggs and meat, the meat either from redundant cockerel chicks or, more frequently, spent laying hens. Poultry farming had increased quickly in the 1930s, with poultry meat providing significant export earnings.⁹ During World War Two the USSR poultry population fell by half, but then quickly recovered.¹⁰ By 1961 Soviet egg production totaled 23.5 billion, twice that of the UK, and three times that of France.¹¹ But the increase in the scale of output masked underlying problems in the efficiency of Soviet poultry farming. Poultry farming on any scale is dependent on animal feeds, and the Soviet agricultural model was increasingly unable to deliver the necessary surpluses over human grain consumption required for animal feed to remain cheap. USSR feed costs were estimated to be more than 50 per cent higher than in the US in the late 1950s and early 1960s.¹² Moreover, dual-purpose chickens took much longer to reach slaughter weight than the increasingly efficient US broilers.¹³ More expensive feed fed to birds for a longer period added up to Soviet poultry meat prices in 1960 being estimated as five times higher than in the US.¹⁴ When Khrushchev focused on what to him seemed the remarkable feed conversion ratio of the Cobb broiler chicken, of around two pounds of feed required to produce each pound of poultry meat, it reflected his acute awareness of the vulnerability of the Soviet agricultural system to increasingly perilous grain output.

From an American perspective, however, the irony of Khrushchev latching on to the Cobb broiler was undoubtedly that other breeds were even more productive and commercially successful during the 1950s.¹⁵ These included Vantress, Hubbard, Arbor Acres and, of particular importance for the emerging European poultry industries, Nichols.¹⁶ Nichols strains delivered such superior feed conversion ratios that they priced competing strains out of the market. With feed costs forming 60 to 70 per cent of the total costs of rearing birds, the feed conversion rate was the single most important indicator of commercial viability. Nichols birds also had low mortality rates and, critically, produced meat that European consumers were

increasingly happy to eat, as can be inferred from Table 1.¹⁷ Nichols distributed its birds across western Europe through its two European subsidiaries, Chunky Chicks (Nichols) located just outside Edinburgh and Nichols Lohrmann of Cuxhaven, near Hamburg, West Germany, and several franchisees.

<Table 1 about here>

Table 1 confirms that the Soviet chicken meat production ran at a higher level than any of its West European peers until the early 1960s (and again after its 1964 crisis). Table 1 also shows how poultry output began to increase rapidly in the late 1950s and 1960s in all West European countries. Some countries, notably the UK, Italy and Spain, saw their poultry sectors grow from very small beginnings to become European leaders by 1973. By contrast French output, initially the largest in western Europe by some distance, suffered a sharp collapse in the mid- to late-1960s, only exceeding its 1965 output by 1972. Finally it is worth noting that several countries, including Germany, the Netherlands, Belgium, Denmark and Sweden, all began with established poultry sectors in the 1950s but experienced only relatively slow growth (even decline) in output over the period. By 1973 the leading poultry meat producers in western Europe were Italy, France, Spain and the UK, the production of which, in aggregate, exceeded the output from the Soviet industry.

II

While Table 1 gives a clear picture of broiler chicken output in Europe by 1973, making any similar inferences about the late 1950s and early 1960s may be problematic. Partly this is because statistics of poultry output before the early 1960s were only haphazardly collected across Europe.¹⁸ But mostly it is because of the inability to disaggregate the new meat producing broilers from the traditional table poultry output within these figures, at least until the broiler flocks became utterly dominant everywhere after, say, 1964 or 1965.

Before the late-1950s, the European poultry population was overwhelmingly a population of egg-laying, not meat-producing, birds. Meat production was a by-product of the egg business. The additional income received for chicken meat from spent layers and redundant cockerels was not insignificant, and had the effect of subsidizing egg prices somewhat.¹⁹ But in western Europe until the late 1950s the

specialized meat-producing sector was very small. Instead European poultry farmers overwhelmingly focused on these dual-purpose birds and so followed what the OECD described as ‘traditional’ poultry-farming methods.²⁰ Specialist chicken meat production was confined to smallholders in a few regions (notably in southern England, France and Italy) where chicken cramming was a traditional trade.²¹ The imperative to adopt agribusiness organizational structures only arrived with broilers.

The very first broilers introduced to Europe were a small number of Nichols birds brought into Scotland by Rupert Chalmers Watson (of Chunky Chicks) in 1949. Numbers remained trivially small until the mid-1950s, when broiler growing began to increase in the UK, followed then by experiments in Netherlands, Germany, Scandinavia and Italy. The increase in these countries’ poultry populations from the late 1950s, was almost entirely attributable to the growth in broiler chickens, not dual-purpose birds, nor specialist egg-laying birds, and so was associated with the first attempts to adopt US technologies and organizational structures.

While there was considerable experimentation with local strains, increasingly from the late 1950s, these additional meat producing flocks were stocked with US broiler strains.²² As far as interpreting Table 1 is concerned, this means that the share of each country’s poultry population that was composed of broilers was growing from a very small base, but at different rates and different start dates in the late 1950s. Table 1 above is therefore an incomplete guide to identifying where poultry-related agribusiness emerged first in Europe. For that we need to identify the growth of the broiler populations in these countries more carefully.

Table 2 presents what are very imperfect data, but are nevertheless the best estimates available of the broiler populations in the leading West European centres from 1956 to 1963. This shows that the economies that led Europe into broiler production were the UK, followed by Italy and then Spain. The next section turns to consider the UK example in more detail.

<Table 2 about here>

III

Agribusiness emerged first in Europe in the British poultry industry. This can partly be observed in the emergence of very high concentration ratios in the poultry industry from the late-1950s onwards when compared to any other agricultural sector, and

partly in the emergence of some very large, fully integrated, poultry firms. Already in the mid-1950s the disappearance of the small farmer was becoming widely acknowledged.²³ K. E. Hunt's report on the European Poultry industries for the OECD mentioned that already by 1960 less than three dozen groups were responsible for sixty per cent of total output. These were still overwhelmingly relatively small firms, but one, Buxted, was alone responsible for a quarter of total output and was growing quickly to become a sizeable food company in its own right.²⁴

After an initial period of experimentation in the broiler industry until the end of the 1950s, the pace of consolidation increased rapidly. Buxted began by acquiring several smaller producers in the south of England in the late 1950s and in 1960 MacFisheries, Unilever's fish and poultry retailer, made a tentative start to integration through acquiring a few processing stations and groups of farmers. But it was in May 1961 that, in the words of the trade journal *Poultry Farmer and Packer*, 'the age of integration' began when Ross acquired the breeding company Sterling Poultry Products.²⁵ Within three years the British poultry sector underwent a dramatic consolidation, led by Ross. Along with Findus and Unilever's Birdseye, Ross dominated the British frozen foods sector and the driving force at Ross was Alex Alexander, who wanted to diversify away from frozen fish and saw great opportunities in broilers. In 1962 Ross first acquired Spinks (another breeding company of laying hens), and then in September it acquired Fairbairn (a Carlisle based breeder of laying hens) and, crucially for its broiler interests, Chunky Chicks (Nichols), to become the largest poultry concern in Europe. Spillers, with its large animal feeds division, acquired a twenty per cent stake in Buxted also in 1962. Fitch Lovell, one of the emerging regional grocery supermarket groups, acquired substantial processing interests to become vertically integrated in its poultry division. That same year the Fatstock Marketing Corporation invested in a new, large processing station, especially to serve Cooperative Retail Society outlets. In 1963, the Vestey's Union International group, with its huge Dewhirst and Eastman chains of retail butchers, acquired a 50 per cent stake in Sun Valley, and the feed company, Bibby, acquired a large minority stake in J. P. Wood. The final acts in this episode were when the feed company Nitrovit muscled Spillers out of its minority stake in the Buxted concern, and J & B Eastwood (then Europe's largest egg producer) diversified into broiler production during 1963 and early 1964.²⁶

<Table 3 about here>

Ten years before there had been no broiler chicken industry, merely a few experiments in chicken meat production by several dozens of small-scale farmers in the immediate aftermath of the derationing of animal feeds in 1953.²⁷ But between May 1961 and February 1964 the entire UK broiler sector in the UK was totally restructured, and moved from a somewhat disaggregated to a highly concentrated and integrated industry. By 1964 the UK poultry industry was dominated by eight large food processing firms, with the leading four now responsible for half of total output. The leading firms were responsible for co-ordinating production from the hatching of both parent stock and the flocks reared for meat, through to all components of the rearing and processing of these birds in now massive flocks, in what had become a highly capital-intensive concentrated industry. This represented a dramatic transformation of the structure of what had become an important branch of British agriculture. Poultry sector output totaled 16 per cent of total British agricultural output already by 1960.²⁸ It signaled the initial diffusion of the agribusiness structure into British agriculture. When Imperial Tobacco acquired first Ross and then Buxted in late 1969 and early 1970, this new group, together with Eastwood, controlled over 60 per cent of the UK poultry sector. No other branch of British agriculture by then displayed anything like a similar level of concentration. The poultry industry was integrated, exploited economies of scale and high levels of capital intensity in its attempt to minimize price volatility in marketing. As Sykes had claimed earlier, the agribusiness structure emerged and reached maturity in the UK first in the poultry sector.

Agribusiness in the UK poultry sector was also the first case of agribusiness structures becoming significant within western Europe as a whole. Agribusiness structures were adopted elsewhere in western European poultry industries, but they lagged behind the UK. The explanation why the UK poultry industry was the first in Europe to adopt US agribusiness structures is not simply one rooted in the growth in poultry output. Italian output quickly exceeded that of the UK, for instance, and by the end of the period French output had regained its former lead and Spanish output had grown more quickly than that of anywhere else (Table 1). Rather the explanation for why agribusiness structures were adopted first in the UK is rooted in the distinctive nature of the end product in Britain. For here, unlike almost anywhere else

in Europe, the near universal method of distributing poultry meat was as a frozen chicken. As will become clear, this innovation was of critical importance in enabling the UK poultry industry to scale up quickly, but it was itself entirely dependent on the legacy of the British food industry's refrigeration infrastructure that had been built up before World War Two.

The UK had traditionally imported vast amounts of its food, more than any other nation in the world, at around one third of the total consumed as late as 1937.²⁹ Before World War Two, the UK was Europe's food importer of last resort. Those economies that focused on producing food for the British market, Denmark and the Netherlands especially, Sweden to a lesser extent, specialized on exporting butter, bacon and other meats. The ownership ties between London food retailers and Dutch, Danish and Swedish producers became ever more enmeshed.³⁰ These large food multinationals had developed their business models around the importation of food. Unilever imported fats, Vestey and the Danish Bacon Company imported meat, and so on. Many of these imported foods required some sort of storage facilities, notably for frozen meat, and so the investment in cold storage within the UK, especially at ports, was far in advance of anything available elsewhere in Europe.³¹ So entrenched in the British food supply system were these large import-oriented food companies that they were the most obvious candidates for organizing and co-ordinating the supply of food and emerging as the UK's version of agribusiness after World War Two. That they did not fulfil this role, and that it was the hitherto obscure poultry industry that was the vanguard of agricultural reorganization, was a consequence of the end of Lend Lease, and so the inability of the large import-led food companies to operate their traditional model after the end of World War Two.

The 1947 Agricultural Act recognized this as a permanent change by introducing a system of support that ensured that British farmers would produce an ever greater share of British food.³² The British grown food product that experienced the greatest change under these new policy conditions was poultry farming. Yet paradoxically poultry was not included in the Agricultural Act's provisions, or even envisaged as being one of its beneficiaries. Rather the Act's largesse was indirectly received by the poultry industry.³³

The first direct cause of the rise of the poultry industry in the 1950s was the memory of its rapid rise in the 1930s. Poultry meat consumption, particularly in restaurants, had then increased very quickly. Poultry meat prices had declined as a

direct result of the 1930s decline in world prices for grains. Frank Sykes (who, along with his brother Geoffrey, was one of the pioneering poultry farmers) claimed poultry farming ‘flourished on the low corn prices ruling before the war’.³⁴ But then the war and specifically the way that wartime meat and feedstuffs rationing prioritized staple meats and not poultry, meant that the table poultry industry died out.³⁵

After the 1954 derationing of meat, virtually no one was anticipating a rapid growth in demand for poultry. Three organisations that were willing to entertain the prospect between them transformed the entire industry, and so indirectly gave rise to the British version of agribusiness. These three organisations were Sainsburys, Unilever’s MacFisheries and the Co-operative Wholesale Society. Sainsburys was by far the most important.

All three were committed to retailing chicken meat. Butchers did not sell chicken meat in the UK in the 1950s. Instead it was multiple grocers like Sainsburys, or the Co-operative retail societies, or fishmongers and poulterers, of which the only organisation to have anything close to nationwide coverage was MacFisheries.³⁶ Butchers did not sell chicken because poultry carried a lower profit margin and needed to be stored at a cooler temperature than red meat. Butchers were roundly criticized by the British poultry interests.³⁷ Multiple grocers, Co-ops, and MacFisheries had all earlier invested in refrigeration capacity that enabled them to retail chilled New York dressed chicken.³⁸ The necessary retailing refrigeration infrastructure was in other words diffused well beyond the butchers’ chains tied to the big meat importing groups, or the dairy and fats retailing chains tied to their large importing groups.³⁹ Moreover, during the mid-1950s these multiple grocers were also in the midst of a format revolution, as British food retailers launched themselves on two decades of experimentation with self service. Their early experiments were predictably very simple. By 1956 Sainsbury, until then a laggard, decided to adopt self-service. But critical to its preferred version of the format was its increasing investment in refrigeration capacity.⁴⁰ Among the emerging supermarket groups a few were taking the self-service model to a new level by including meat and dairy products in refrigeration cabinets in their new versions of the format.

The combination of the emerging supermarkets with their enhanced refrigeration infrastructure, and the potential for the poultry industry to deliver a novel meat product that depended on suitable refrigeration infrastructure meant that there was an extraordinary moment between 1956 and 1959 when a few individuals were

able to shape the entire structure of the future poultry industry. The key decision they took was to prioritize frozen chicken.

The British decision to focus on frozen chicken was ‘a deliberate decision by the pioneers’.⁴¹ Unilever’s Birdseye subsidiary had already experimented with frozen chicken in 1954 and 1955. But its reception was muted. In 1954 less than 1 per cent of 5 million birds were sold frozen.⁴² But by 1960 three-quarters of 100 million birds, and in 1961 over 80 per cent of the 140 million birds sold, were sold as frozen oven-ready whole birds.⁴³ This remarkable growth in sales was not attributable to some latent demand for frozen chicken among British households. The retailers were fully aware of consumers’ ambiguity towards it. When asked, British consumers reported a strong preference for fresh over frozen chicken.⁴⁴ Moreover, British families were not well equipped to store frozen chicken. The diffusion of refrigerators in British households was relatively low and lagged behind other West European countries. Only 20 per cent of British households had a refrigerator in 1960, for example, and few of these would have had a freezer cabinet big enough to store a frozen chicken.⁴⁵

This decision by suppliers to focus on frozen chicken is only explainable when the emerging agribusiness structure is understood. The big retailers of poultry entered into informal ‘understandings’ with those few chosen producers (seen in Table 3 above) able to deliver fixed quantities of birds at certain pre-specified time points.⁴⁶ Such was the scale of production and the capital investment required to guarantee cost savings, that producers needed to be confident that would not be committing resources to crops that, at the point of slaughter, would be entering a market along with an excess supply from other producers, leading to price declines and profit losses. The retailers were content to keep prices stable as long as supplies were guaranteed. Producers therefore had a strong incentive to devise some method of storing temporary surplus output and so to co-ordinate the market and stabilize the price. Moreover, in 1958 and 1959 the leading retailers switched away from New York dressed to eviscerated birds. This dramatically increased poultry meat’s perishability when chilled, but not when frozen.⁴⁷ The existence of a large pre-existing refrigeration infrastructure within distribution channels in Britain meant that the costs of freezing chicken were more than outweighed by the benefits of improved price stability from co-ordinating supply. These conditions meant that developing a full-scale poultry industry from scratch within just a handful of years was therefore

possible in the UK. But it still required entrepreneurs of great vision and organizational discipline to make it happen.

IV

Several western European countries had developed highly successful agricultural sectors before World War Two, as already noted above, with large multinational food companies dominating food processing and trading. But farming remained small scale, with co-operative associations having emerged in the late nineteenth century to organize the production and marketing of farm produce. These co-operative associations were overwhelmingly viewed with great admiration by agricultural authorities around the world. In 1961, W. T. Price, the Principal of Harper Adams College, pointed to the co-operative associations of the nascent EEC as providing a far superior model for the marketing of food than that prevailing then in the UK.⁴⁸ While there were substantial differences between them, there were also sufficient similarities in the influence and nature of co-operative associations to think of the Netherlands, much of Scandinavia and Germany as being more like each other than other European agricultural systems.⁴⁹

The poultry industry of the 1950s in these European countries was, as Table 1 indicates, relatively advanced and well developed. Poultry meat production here was firmly a by-product of the egg-producing sectors, several of which (the Netherlands and Denmark in particular) were focused on producing eggs for the British market.⁵⁰ By the 1950s there was an organized infrastructure in these countries that enabled chickens to be processed and delivered to market to meet the demand for chicken meat.⁵¹ But in all these countries the co-operative system meant that the poultry farmers remained independent, they contracted in open markets and their flock sizes remained relatively small. Despite the same access to superior US technology, the agricultural systems in these northern and western European nations were unable to take advantage of the potential benefits compared with the nascent poultry agribusinesses in the UK. This was because there were no actors able to coordinate these markets sufficiently to allow the investments required for successful broiler production. Even in 1961 the overwhelming majority of chicken meat sold in these markets was still the ‘poor types of cockerel reared by the egg producer... [and] hens culled from [laying flocks]’. The inferior meat from the dual purpose birds spoiled the market for the potential specialist chicken meat producer wanting to invest in

broilers.⁵² Writing for the OECD in 1961, Hunt placed the blame squarely at the ‘co-operative tradition’, which inhibited vertical integration. The net result was much less concentration, far smaller businesses, a far smaller uptake of the new broiler breeds, much less advanced nutrition in the feeds industries, and the persistence of traditional slaughtering practices.⁵³

There were variations on this theme in each of these countries of course. Sweden, for example, stands out as being the only European country other than the UK to have adopted the US model by 1960. Swedish growers were buying US strains for rearing from the early 1950s.⁵⁴ The frozen food company Findus was able to exploit its dominant position within Sweden to make major investments in frozen chicken. It alone supplied 50 per cent of the Swedish market.⁵⁵ Moreover, Sweden had developed self-service format in food retailing more than any other European nation by 1960.⁵⁶ The Swedish Findus-led model of poultry industry was more concentrated, and more integrated than even in the UK by 1960. But in volume terms, it was tiny (Table 1).⁵⁷

The West German poultry industry was certainly not tiny, and it had the potential to adopt US technologies and organization quickly, but it failed to do so. West German consumers, like Swedish and British, were quick to adopt frozen chicken, with over one third of German sales of chicken as frozen in 1963.⁵⁸ These were retailed easily enough through the relatively advanced German food distribution system, where voluntary chains and co-operatives had quickly adopted the self-service format and invested in extensive refrigeration capacity.⁵⁹ More German households had refrigerators than anywhere else in Europe, with 31 per cent of West German households having a domestic refrigerator in 1959.⁶⁰ Moreover, with the Nichols subsidiary in northern Germany, German producers had easy access to superior breeds. While poultry output grew quickly after World War Two, there was no move towards increasing scale of production and no attempts to pursue vertical integration among the co-operative associations in Germany at this time.⁶¹ When US frozen chicken imports to Germany increased from 1960 to 1964, German producers were uncompetitive and exited the market.⁶²

Imports of frozen chicken meat from the USA were banned in the Netherlands and Denmark, but in these two countries the co-operative associations of farmers also failed to switch from traditional dual-purpose flocks to broiler chickens anything like as quickly as was the case in the UK, in Sweden, and, as we shall see, in Italy and

Spain. In both countries agricultural production was advanced. Indeed, they were the most advanced and commercially successful agricultural sectors in Europe. Both egg production and meat processing were central to both these countries' agricultural systems. The Danish meat processing sector was dominated by four big co-operative slaughterhouses, and Dutch by a handful of large independent processors.⁶³ Both possessed the necessary refrigeration infrastructures, but neither country had particularly advanced distribution systems for poultry. Despite the self-service format being widespread there, the Netherlands restricted poultry distribution to only 600 poulterers, so consequently domestic consumption was low.⁶⁴ Danish chicken meat production actually declined after 1964 as its livestock farmers switched into pork and bacon production (Table 1).⁶⁵

Where Danish and Dutch firms had developed superior techniques was, however, in machinery production. Already by 1960 Danish and Dutch incubators and hatchery machinery began to be sold throughout Europe displacing US suppliers. By the mid-1960s the Danish and Dutch processing machinery manufacturers were acquiring a world leading reputation.⁶⁶ Overall therefore Europe's most advanced agricultural sectors in the late 1950s, Denmark and the Netherlands, found they were unable to increase broiler chicken output anything like as quickly as the UK, or Italy or Spain. While they were able to specialize in machinery production, broiler chicken flock sizes remained relatively small, and vertical integration muted. In these economies agribusiness did not emerge through poultry but rather, later, through different agricultural sectors, with different characteristics, and hence with different priorities in the developing discussions within European agriculture in the 1970s and 1980s.

V

In contrast to the economies of Denmark, Germany, the Netherlands and Sweden, France, Italy and Spain had all developed major poultry meat sectors by 1973 (Table 1). By then these sectors were all dominated by large, vertically integrated, US-style agribusinesses – albeit concentration levels here did not reach the levels seen in the US or UK until the 1980s and 1990s. As was the case with the UK, agribusiness organizational structures emerged first in France, Italy and Spain through the poultry sectors. The similarities in these end points disguise differences in the development paths.

The French poultry industry in the late 1950s was clearly the largest in western Europe (Table 1). But it was organized around many thousands of small scale farmers rearing slow-growing birds for local markets, with a significant minority distributed through the Les Halles wholesale market in Paris.⁶⁷ France, like elsewhere, had developed a sophisticated egg producing sector, especially in the northwest, during the inter-war period. What was novel, however, was the development of a French meat bird, the Bresse, in the 1930s, with its AOC awarded in 1936.⁶⁸ The demand for these birds is likely to have been disproportionately influenced by the Parisian restaurant trade, for they were an expensive product. While French banks, especially Credit Agricole, had provided funds for consolidation in the 1950s, there was no significant move towards vertical integration until the 1970s, when a few Brittany-based slaughterers and feed producers (such as the Doux brothers and the French subsidiary of US feed producer, Ralston Purina) reorganized the poultry sector and adopted US methods.⁶⁹ The French poultry industry therefore remained based around small scale farmers and small scale processors until the early 1970s, with little cold storage capacity within the distribution channels.⁷⁰ So while output was relatively high, it was expensive. As competition with Dutch and British poultry producers began in the mid-1960s, French output fell (Table 1). French producers complained of being ‘sacrificed to the Common Market’.⁷¹ French distribution costs were high. Refrigeration infrastructure was under developed.⁷² In 1961 there were cold storage facilities in only 12 French cities.⁷³

In Italy the poultry sector originated mostly with egg laying, but also from a traditional market for chicken meat from farmyard birds. These were reared in small flocks on peasant holdings and sold in local markets.⁷⁴ Food retailing was relatively backward, with the smallest percentage of food shops converting to self-service in all Europe by 1960.⁷⁵ Refrigeration infrastructure within the distribution channel was also underdeveloped compared with the UK or other western European nations.⁷⁶ On the other hand, 24 per cent of all households had domestic refrigerators in 1961, which was relatively high for the time.⁷⁷

Italian poultry meat production grew quickly from 1955 to 1960, initially through the expansion in the number of farmyard birds produced by many thousands of smallholders (Table 1). But already by the early 1960s a small number of innovative entrepreneurs were adopting US technologies and methods. ‘Generally speaking the Italian situation follows the American patterns [of integration] much

more closely than that of other European countries', opined Hunt in his *Survey* for the OECD.⁷⁸ Feed companies and hatcheries had begun to integrate by 1960. Notably the firm of CipZoo had adopted US techniques and methods more or less entirely. Other fast growing poultry firms imported machinery from the Netherlands, veterinary medicines via the UK subsidiaries of US pharmaceuticals firms, and US strains via breeding companies' subsidiaries and franchisees in Belgium, the Netherlands and Germany.⁷⁹

But CipZoo's progress faltered, despite a major injection of equity by the UK feed company Bibby, which acquired the business in 1970. This was largely because Italian consumers rejected both the frozen chicken and the chilled wet chicken. It was not until the early-1960s, when a second company, Arena, devised a method of refrigerating chickens without using ice-water, that Italian consumers began to increase their consumption of broiler chickens substantially, enabling Arena to grow into Italy's largest poultry producer. By the early 1970s the Italian industry, with Arena, AIA (a later entrant) and CipZoo its leading firms, was Europe's largest poultry sector.⁸⁰

Spanish producers also saw accelerated growth through the 1960s and 1970s. But unlike Italy, the growth in poultry output began from essentially nothing in the early 1950s. There were not even any small-scale producers in Spain at that date. This was because prior to the 1953 Pact of Madrid, Spanish agriculture had struggled to supply enough grain for human consumption and so the use of grain as animal feed was forbidden. After 1953 with the first US imports, there was some experimentation with an egg industry, and the Spanish subsidiaries of US multinational feed companies provided substantial technical assistance.⁸¹ The broiler chicken industry did not begin until after 1960, when restrictions on animal feeds were lifted (and then were fully liberalized from 1962), along with the growth in demand from the liberalisation of the economy, and the consequent urbanization and rise in living standards. Newly resident city dwellers brought with them a taste for chicken meat from their home-reared yard birds in the country. The Spanish poultry meat and egg industries began only from 1960. Entrepreneurs imported US chicken strains (notably from Hubbard), imported machinery and feedstuffs, and adapted US-style vertically integrated organizations. Prices fell and US-style New York dressed, chilled chicken quickly became popular with Spanish consumers. While the costs of distribution were initially high (with very low diffusion of the self service format), the Spanish food

distribution system modernized quickly from the second half of the 1960s onwards.⁸² With imported feed prices low, chicken meat prices quickly fell below alternative meat products and demand took off. Indeed the broiler became known as a cheap meat in Spain. In Spain, as elsewhere, the agribusiness structure first entered and acquired influence through the poultry sector.

VI

Considering post-war Western Europe overall, it is not wholly surprising that agribusiness structures first emerged in the UK. The UK remained the wealthiest economy after the war, with the highest standard of living and the most developed food industry. What surprised contemporaries was that agribusiness emerged first in the poultry sector. The signs had been there for a few years. Geoffrey Sykes warned British poultry farmers in February 1960 that if they failed to adopt big business practice, within a few years, either the processors or the retailers would control the sector.⁸³ Sykes's thinking had evolved over the previous few years. In 1955 he had advocated 'co-operative ownership' as the preferred vehicle for integration and capital injection in the poultry sector. But by the late 1950s he was forecasting the emergence of large firms.⁸⁴

This occurred in poultry, as opposed to other more established sections of British agriculture, because of a unique set of opportunities to make a new market for frozen chicken.⁸⁵ First, the roles played by the select group of retailers must be emphasized. Sainsburys, MacFisheries and the Co-operatives (along with several smaller chains) were deliberately pushing first refrigerated and then frozen produce in their versions of the self-service format. This proved attractive to consumers, and so propelled the emerging poultry farmers into positions as lead suppliers. The high perishability of chilled chicken and the potential for what would have been unacceptable levels of price volatility meant there was a strong incentive to coordinate the market through informal 'understandings', and so to stabilize the price. Given the widespread presence of a cold storage infrastructure with the UK food distribution system, the decision to emphasize frozen chicken with consumers allowed retailers and producers to scale up quickly. By 1961 almost every food shop had a deep freezer cabinet.⁸⁶ With such a developed cold storage infrastructure, the relative cost of freezing was much lower in the UK than elsewhere in Europe. In the early 1960s the cost of storing frozen goods in Britain was less than one per cent of that in

France, for example.⁸⁷ With the potential benefits from market co-ordination and price stability so high, the selection of frozen chicken as the product to develop when freezing was so cheap, was obvious. Producers had to organize production, which required organizational and managerial competences that few farmers possessed. It is noteworthy in the British case that almost all of the leading integrated poultry businesses were headed by owners and senior managers who had been military officers during or immediately after the war.⁸⁸ It would be impossible to prove, but it was perhaps the organisational skills developed during military service which were to prove so valuable in building the poultry industry so quickly in the UK.

In Western Europe those countries with relatively efficient agricultural sectors also seemingly had many or all of the preconditions for an agribusiness-led poultry industry in place. But it was the farmers here, according to Hunt, that were not wanting to be as forward-looking as the poultry farmer entrepreneurs in the UK, and so resisted the logic of agribusiness.⁸⁹ This is a potential explanation for the differences in the pattern of poultry industry growth and in the adoption of agribusiness organization. The Netherlands and Denmark, and perhaps also Germany, could have developed a frozen chicken industry efficiently had farming and retail interests there wished to do so. The costs of cold storage are unlikely to have been significantly higher than in the UK. Their food retailers had largely switched to self-service, and so, presumably, were able to accommodate frozen or chilled chicken. The access to domestic refrigeration in households was at least as high - if not higher - than in the UK. The existing level of husbandry skills among the livestock farming communities was also as high as in the UK (although by comparison few farming entrepreneurs came from military backgrounds). But the poultry industry in these countries failed to take off as it did in the UK, and when the agribusiness structure diffused here it was by a different route. The explanation that seemed most persuasive to contemporary investigators was that the prevalence of co-operative associations among farmers acted as an institutional constraint to vertical integration within broiler farming. Without more research, such an inference must be treated with caution. An alternative explanation might focus on the differences in the structure of food retailing and the implications for promoting poultry. Supermarkets in the Netherlands, West Germany and Denmark mostly emerged out of department store chains, in contrast to the UK, where it was multiple grocers that developed the self-service format most

successfully. Perhaps this difference had an impact on the relative commitment to refrigeration?⁹⁰

By contrast the countries where the poultry industry grew most quickly, reached the greatest level of output by 1973, and where the agribusiness method of organisation became established were Italy, Spain and France. The existing sector in France, with its focus on a sophisticated but high cost product, may well have had to defer to the new broiler chicken industry that emerged later in Brittany. Currently too little is known (at least in the English language literature) on developments in the broiler chicken industry in France to be able to draw robust conclusions. Italy and Spain by contrast grew their broiler industries from very small beginnings.

But even here there were significant differences. The Spanish poultry industry entrepreneurs essentially adopted US-style techniques and agribusiness structures in their entirety. In Spain the product was similar to the US wet, chilled chicken. In Italy, however, where there was relatively little cold storage capacity in the distribution channel, the key event was when Arena began to distribute dry-chilled chicken, a much higher quality product, which met with immediate and widespread market acceptance.⁹¹ But neither Italian nor Spanish producers were joined by food retailers in any form of market co-ordination. Indeed the food retailing systems in both countries remained relatively backward until after this period.

The final conclusion therefore, for what remains an exploratory paper, seems to be that agribusiness emerged first in Europe through the UK poultry industry because of the unique circumstances there that propelled frozen chicken into the market as the near universal form the food took for a decade or more. In the rest of Europe, where frozen chicken was less popular or more expensive or both, the emergence of the broiler chicken sector was slower. This may have been from inertia imposed from the co-operative associations, or it may have been more to do with differences in their emerging supermarket sectors. In the UK, Italy and Spain (and then latterly in France), where the broiler sector grew quickly, agribusiness structures diffused there through the poultry industry. In those countries where the broiler sector grew only slowly (Germany, Denmark and the Netherlands), agribusiness organisations emerged through other sectors. The final conclusion must remain somewhat conjectural, for while we have good knowledge of the emergence of the broiler sectors and their organization in the UK, Italy and Spain, relatively little is currently known about the French, Dutch, Danish and German sectors.

To return to the article's start-point, had Khrushchev remained vigilant for the interests of the Soviet poultry sector, what would he have concluded from this institutional complexity that either promoted or retarded the diffusion of the modern broiler chicken strains, like the Cobb? Soviet poultry farming was organized around large collectivist farms, with ties to leading research centres. While the Soviet farms had little concern with efficient marketing and price volatility, they had acquired considerable expertise in breeding and rearing livestock. As Table 1 shows, Soviet poultry output quickly recovered its position as European leader. By 1973 Soviet output was twice its 1964 level. While this growth in meat output was based on imported strains (notably Dutch breeds), it is noteworthy that the Soviet sector retained its preference for dual-purpose birds. Perhaps in consequence, its broiler production remained very inefficient by comparison to US and West European norms. The diffusion of the agribusiness structure in the leading broiler producing countries in Europe appeared, in other words, to have led by 1973 to significant gains in relative efficiency over the USSR, not primarily through technological advantages but instead through the marketing imperative to reduce price volatility.⁹²

Table 1. Chicken Meat Output in Selected European Nations, 1956-1973 (tonnes)

	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
<i>USSR</i>						813000	822000	802000	606000	696000	745000	764000	817000	866000	1071000	1183000	1237000	1295000
<i>France</i>		225000	265000	305000	350000	439000	458000	494000	531000	555000	389500	401350	404800	494572	523357	535678	588174	618344
<i>United Kingdom</i>	139000	157000	179000	229000	275000	294000	307000	306000	326000	341000	369000	402000	456200	477500	494800	501000	556800	552000
<i>Italy</i>	84000	98700	140000	180000	221600	246700	292600	341400	410400	490100	527500	507100	528700	535900	561000	543000	579000	641000
<i>Germany</i>		80000	88000	96000	124000	150100	150200	164000	185400	192000	213400	240400	250000	267800	299100	326600	327200	366800
<i>Netherlands</i>		47600	56200	70400	70000	84000	98413	104800	127598	150650	183000	206000	220000	245000	292000	319000	328000	339000
<i>Spain</i>		12000	12000	12500	13000	79100	107200	185000	210600	231400	302600	350350	347540	382800	496000	474000	551000	597000
<i>Denmark</i>	24000	23000	35000	45000	60750	76500	84000	77600	90100	78100	60300	58500	56500	60700	70100	70900	75800	80100
<i>Belgium-Luxembourg</i>		44500	48700	54000		70212	80481	81399	85979	92012	95928	99465	101316	102774	112102	111611	109901	114814
<i>Sweden</i>		10335	10900	11800		19000	17000	19000	18800	20200	20600	26400	27800	26000	24500	25500	29700	33000

Note: the order of nations is by output in 1961, the first year of the United Nations series of data. The nations listed are the nine leading producers of chicken meat in West Europe in 1973, along with the USSR, for the purposes of comparison. Were the table to include other East European nations, then Poland, Romania, Hungary, Yugoslavia, Bulgaria and Yugoslavia all attained higher output than Sweden in 1961, and so would be included.

Sources: For all years from 1961 onwards: Food and Agriculture Organization of the United Nations (FAOSTAT)

<http://faostat3.fao.org/home/index.html>. Prior to 1961 figures are for chicken meat: from this date onwards, the table gives figures for all poultry meat. Data for earlier years is drawn as follows.

France: 1960 from OECD, *Survey*, 1961, p. 116 (deadweight uneviscerated). 1957 inferred from Talbot, *Chicken*, p. 12 (Talbot states that French output was almost half EEC6 output in 1957) and OECD, *Survey*, for the output of the other EEC6 nations. 1958-60 values are straight-line (SL) interpolations to the nearest 5000.

Netherlands: OECD, *Survey*, p. 145, reports liveweight totals for 1957-9. These have been deflated to 80% (following the formula reported on p. 125). Note this broadly agrees with Talbot, *Chicken*, p. 12, which states Dutch output doubled between 1957-1961.

Germany: OECD, *Survey*, p. 125 for 1957-59. 1960 is a SL interpolation.

Spain: Clar, email to author 12 July 2013, with 1957 SL interpolation for 1954 (unreported here) and 1960 observations.

UK: Richardson, *Poultry*, Table II for pre-war, 1946/7, and 1953/4 values. 1957-60 values all from OECD, *Survey*, p. 172.

Italy: Tessari and Godley, 'Poultry', Table 2 for 1957 and 1960. 1958 and 1959 are SL interpolations. 1956 is also a SL interpolation between 1955 (not reported here) and 1957. 1955 value from OECD, *Survey*, p. 142.

Denmark: OECD, *Survey*, p. 105, Table. II - 'Disposal' - includes all poultry - for 1956-59. 1960 value is a SL interpolation.

Sweden: OECD, *Survey*, p. 156 for 1958-59.

Belgium: OECD, *Survey*, p. 98 - all poultry.

Table 2. Broiler Output, 1957-63 in Selected European Nations ('000 tonnes)

	1956	1957	1958	1959	1960	1961	1962	1963
UK	51	60	73	113	138	220.5		
DK		1.9	6	13				
D				16.3				
ITA			20	46.8	70.9	93.7	128.7	170.7
NL		15.6	22.3	29.2		40		
SWE			1.2	2	2.7			
SPA							64.3	133.2

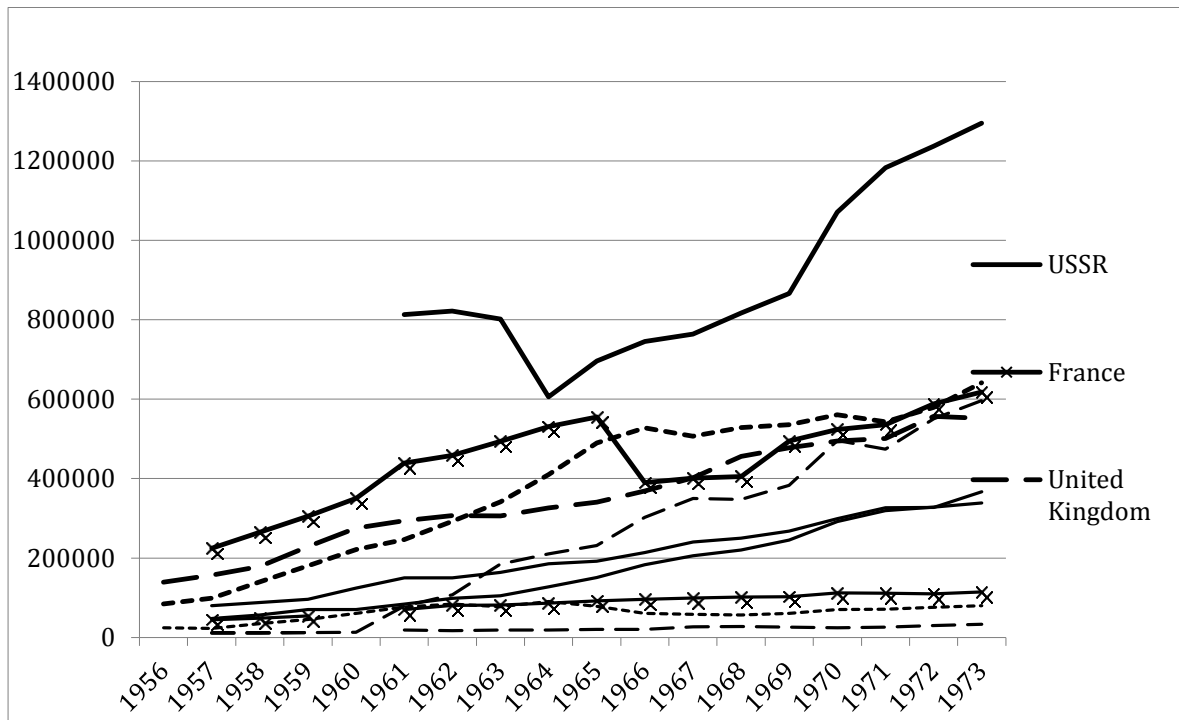
Source: OECD, *Survey*, 1961 and Table 1. Italian data deflated after consultation with Alessandra Tessari (email with author 25 Sept. 2013), where broilers actually 20% of total in 1958 rising (in equal increments) to 80% by 1968. Using total output from table 1 this produces the figures used here.

Table 3. Consolidation in the UK Poultry Industry, 1961-70.

<i>Entrant</i>	<i>Existing related subsidiaries</i>	<i>Investment</i>
Ross	Ross Foods – frozen fish and vegetables	1961: acquired Sterling Poultry Products. 1962: acquired Spinks, Faribairn and Chunky Chicks (Nichols)
Fitch Lovell	Food Retailing - Key Markets	1962: Fitch Lovell Poultry
Fatstock Marketing Corporation	None - but strong relations with Co-operative Wholesale Society	1962: Processing station
Spillers	Supplied animal feeds, but no direct interests	1962: purchased 20 per cent holding in Buxted
Vestey family/ Union International Group	Dewhursts & Eastman butchers & two processing stations	1963: Acquired 50 per cent holding in Sun Valley
Bibby & Co	Supplied animal feeds, but no direct interests	1963: acquired a minority holding in J. P. Wood (Midland Poultry Holdings)
J & B Eastwood	Eggs	1964: built broiler division
Nitrovit	Supplied animal feeds, but no direct interests	1964: acquired the Spiller's minority holding in Buxted.
Allied British Foods (Weston family interests)	none	1968: Acquired Ross and renamed it Allied Farm Foods
Unilever	Birdseye (frozen food), BOCM (animal feeds), Macfisheries (food retailing)	1968: J&P Woods (Midland Poultry Holdings)
Imperial	none	1969: acquired Allied Farm Foods (Ross) and 1970: acquired Buxted.

Sources: in general reports in *Poultry Farmer and Packer*, *passim*, in particular Ross, 5 Sept. 1962 and 8 May 1963; Bibby and J. P. Wood, 5 June 1963; Fitch-Lovell, 24 Oct. 1962 (p. 29); the Eastwood diversification, 5 Sept. 1962; Vestey-Sun Valley, 27 Mar. 1963; Spiller-Buxted, 1962, and Nitrovit-Buxted: *Economist* 15 Feb. 1964. Additional content from: Fitch Lovell: Monopolies and Mergers Commission, *Linfood Holdings plc and Fitch Lovell plc – a report on the proposed merger 1983* (HMRC, London), pp. 19-20; Unilever – J & P Wood see Ted Burnham obituary, *Farmers Weekly* 15 Sept. 2010 (<http://www.fwi.co.uk/articles/15/09/2010/123976/ted-burnham-1924-2010.htm>); and for the shortlived Weston family involvement in the broiler industry and subsequent entry by Imperial, see Trelford, Holroyd and Wells, *History*, p. 171.

Figure 1. European chicken meat output, selected nations, 1956-63



Source: drawn from Table 1.

¹ Roger Ransom, 'Cobb's early lesson in capitalism', at <http://www.thepoultrysite.com/poultrynews/16168/cobbs-early-lesson-in-capitalism> (accessed 3 Sept. 2013). The memorandum is dated 18 July 1964. Ransom's article is drawn from correspondence between Wim Dekkers, of Cobb Germany, André Gerrits, of the University of Amsterdam, and Professor Sergei Khrushchev, son of the former Soviet leader, of Brown University, Providence, Rhode Island. This correspondence was also sent to Professor Hoyle who showed it to the author, indirectly precipitating this article. This correspondence also includes a letter from Professor Nils Roll-Hansen, University of Oslo, outlining the context of the memo, and the politicization of Soviet science during the Khrushchev era, with specific reference to the Lysenko controversy. See email correspondence Wim Dekkers (Cobb-Germany) to Richard Hoyle, 25 Mar. 2008. Cobb, then headquartered in Massachusetts, had opened a British subsidiary in 1961, hence its stand on the British pavilion. Khrushchev reputedly had a lifelong interest in poultry.

² Ransom, 'Cobb's early lesson', fails to mention the wider context of the Soviet agricultural crisis. Naum Jazny, 'Production costs and prices in Soviet agriculture', in Jerzy F. Karcz (ed.), *Soviet and East European agriculture* (1967), pp. 212-34, notes the fall in output but offers no explanation (p. 277, n. 40). It is my speculation that the dramatic fall in Soviet poultry meat output was caused by a shortage of feed grains.

³ Geoffrey Sykes, *Poultry: a modern agribusiness* (1963). This is an important book, articulating the economics of the modern poultry industry better than anyone hitherto. Sykes had written many articles for the trade journal *Poultry Farmer and Packer* from 1953 onwards, which show the evolution of his thinking.

⁴ The biographical information is taken from Sykes, *Poultry*, on the jacket blurb. Also see Sykes, 'Letter to the Editor', *AgHR* 18 (1970), p. 51.

⁵ And subsequently developed the highly influential *A concept of agribusiness* (1957), co-authored with Ray Goldberg. See Shane Hamilton, 'Agribusiness, the Family Farm, and the politics of technological determinism in the post-World War II United States', in *Technology and Culture*, forthcoming.

⁶ Bruce Gardner, *American agriculture in the twentieth century: how it flourished, what it cost* (2002), pp. 165-7 emphasizes productive efficiencies, p. 175 on gains through marketing. Hamilton, 'Agribusiness'. Co-operatives were organizational

innovations to enhance production efficiencies as well of course. Eva Fernandez, ‘Selling agricultural products: farmers’ co-operatives in production and marketing, 1880-1930’, *Business Hist.* 56 (2014), pp. 547-68; A Carlos Morales Gutiérrez, Teresa Romero Atela and Dolores Muñoz Dueñas, ‘A Comparative Synthesis of twentieth-century agricultural cooperative movements in Europe’, *J. Rural Cooperation* 33 (2005), pp. 47-65; Koen Frenken, ‘The evolution of the Dutch dairy industry and the rise of co-operatives. A research note’, *Eindhoven Centre for Innovation Studies*, Working Paper 13.07 (2013).

⁷ John Gray, ‘The Common Agricultural Policy and the re-invention of the rural in the European Community’, *Sociologica Ruralis* 40 (2000), pp. 30-52.

⁸ David Burch and Geoffrey Lawrence (eds), *Supermarkets and Agri-food Supply Chains* (2007).

⁹ Stuart Thompstone, ‘“Bab’ye Khozyaystvo”: Poultry-keeping and its contribution to peasant income in pre-1914 Russia’, *AgHR* 40 (1992), pp. 52-63; and *Poultry Farmer* 16 Jan. 1954 on UK pre-war imports of poultry meat from Hungary, Lithuania and Russia.

¹⁰ Gregor Lazarcik, ‘The reformation of Czechoslovak agriculture since World War Two’, in Karcz (ed.), *Soviet*, pp. 385-406, esp. p. 396.

¹¹ *Poultry Farmer and Packer*, 16 May 1962. UK 1961 output was 12.4bn eggs, French 8.5bn eggs.

¹² Jazny, ‘Production costs’, pp. 223-4.

¹³ *Ibid.*, p. 232. Margaret Derry, *Art and science in breeding: Creating better chickens* (2012), pp. 154-77.

¹⁴ Jazny, ‘Production costs’, p. 227.

¹⁵ Cobb, established in 1916 in New Hampshire as a laying hens breeding company, entered the broiler market in the late 1940s/early 1950s, no doubt inspired by the successive ‘Chicken of Tomorrow’ contests of 1948 and 1951. See Roger Horowitz, *Putting meat on the American table: Taste, technology, transformation* (2006), ch. 5. Also more generally on the US developments, see William Boyd, ‘Making meat: science, technology, and American poultry production’, *Technology & Culture*, 42 (2001), pp. 631-64; and K. J. Cooke, ‘From Science to Practice, or Practice to Science? Chickens and eggs in Raymond Pearl’s Agricultural Breeding Research, 1907-1916’, *Isis* 88 (1997), pp. 62-86. By 1956 Cobb was selling broiler chicks

throughout the US. In 1961 it opened its first overseas subsidiary, in conjunction with Anglian Hatcheries, establishing Cobb Breeding Co. UK. The UK subsidiary went on to become a global force in the late 1960s and 1970s. Cobb was acquired by the pharmaceutical company Upjohn in 1974, and is now a part of the Cobb-Vantress division of Tyson Foods. See Redcomb Genetics, Poultry industry histories, <http://www.redcomb.co.nz/> (last accessed 10 Sept. 2013).

¹⁶ Hubbard opened its first European subsidiary in Belgium in 1962: *Poultry Farmer and Packer* 1 Aug. 1962. Nichols was one of the first commercial broiler breeders in the US, beginning in 1938. By the end of the 1950s over 40% of female broilers worldwide was Nichols stock, see Redcomb Genetics, web reference as before. Arbor Acres and Nichols merged in the summer of 1960, *Poultry Farmer and Packer*, 9 July 1960.

¹⁷ *Poultry Farmer and Packer*, 16 May 1962, p. 29. In time the Feed Conversion Rate was superseded by Low Cost Feed Formulation calculations, see *Poultry World* 26 July 1973, p. 26.

¹⁸ OECD, *Survey on the organisation of marketing poultry meat with special emphasis on broilers* (OECD Documentation in Food and Agriculture, 58, 1961), p. 1 includes the caveat about the scarcity of reliable statistics for several European countries.

¹⁹ National Farmers Union, *Report on Marketing* (1957), p. 6.

²⁰ This is the overwhelming conclusion of the 1961 OECD *Survey*, for example, pp. 10-11 (where it concludes that laying flocks predominate in Europe, and numbers of broilers are modest).

²¹ Brian Short, “‘The art and craft of chicken cramming’: Poultry in the Weald of Sussex, 1850-1950”, *AgHR* 30 (1982), pp. 17-30; Karen Sayer, ‘Battery birds, “Stimulating” and “Twilighting”: the ecology of standardised poultry technology’, *History of Technology* 28 (2008), pp. 149-68; and ead., “‘His footmarks on her shoulders’: the place of women within poultry keeping in the British countryside, c.1880-c.1980’, *AgHR* 61 (2013), pp. 301-29. For Italy and France see below.

²² British breeding companies, notably Ross, Cobb (UK) and Sykes (as well as British United Turkeys in that sector), began to meet with increasing global success from the mid-1960s. See M. E. Trelford, Peel H. Holroyd, and R. G. Wells, *History of the National Institute of Poultry Husbandry* (1986), pp. 164-172.

²³ Rupert Coles, ‘Dual purpose birds are finished’, speech to BOCM Poultry Conference, reported in *Poultry Farmer* 26 Nov. 1955; and his comments on changes to flock sizes, reported in *Poultry Farmer*, 27 Oct. 1956, p. 10.

²⁴ OECD, *Survey*, p. 11.

²⁵ *Poultry Farmer and Packer*, 8 May 1963, p. 16.

²⁶ See Table 3 for sources for this paragraph.

²⁷ Geoffrey Sykes opened the country’s first broiler farm just outside Salisbury in early 1953. See *Poultry Farmer*, 3 May 1953. Andrew Godley and Bridget Williams, ‘The chicken, the factory farm, and the supermarket: The industrialization of poultry farming in Britain and the United States, 1950-1980’, in Roger Horowitz and Warren Belasco (eds), *Food chains: Provisioning, from farmyard to shopping cart* (2009), pp. 47-61.

²⁸ Trelford, Holroyd and Wells, *History*, p. 168 – the leading four producers in 1964 were Buxted, Fitch Lovell, FMC and Ross. *Poultry Farmer and Packer*, 19 Nov. 1960.

²⁹ Paul Brassley, ‘British farming between the wars’, in Paul Brassley, Jeremy Burchardt and Lynne Thompson (eds), *The English countryside between the wars: regeneration or decline?* (2006), p. 190 and Table 3, p. 194. Also see Abigail Woods, ‘Rethinking the history of modern agriculture: British pig production, c.1910-1965’, *Twentieth-Century British History* 23 (2) (2012), pp. 165-191.

³⁰ Jesper Strandskov and Kurt Pedersen, ‘Pioneering FDI into the Danish bacon industry: Building and agro-industrial diamond’, *Scandinavian EcHR* 48 (2000), pp. 42-56; Doreen Arnoldus, *Family, family firm, and strategy: Six Dutch family firms in the food industry, 1880-1970* (2002) on Dutch processors and their ties to UK. More generally on foreign ownership of British retailing, see Andrew Godley and Scott Fletcher, ‘Foreign direct investment in British retailing, 1850-1962’, *Business Hist.*, 42 (2000), pp. 43-62; idem and idem, ‘International retailing in Britain, 1850-1994’, *Service Industries J.* 21 (2001), pp. 31-46; and ‘Foreign entry into British retailing, 1850-1994’, *International Marketing Rev.* 17 (2000), pp. 392-400; and Andrew Godley, ‘Foreign multinationals and innovation in British retailing, 1850-1962’, *Business Hist.* 45 (2003), pp. 80-100.

³¹ Derek Oddy, ‘From roast beef to chicken nuggets: food technology and meat consumption in Britain in the twentieth century’, in Derek J. Oddy and Alain Drouard

(eds), *The food industries of Europe in the nineteenth and twentieth centuries*, (2013). Oddy focuses on the UK experience, but includes occasional European comparisons, such as the absence of any refrigerated shipping in France and Italy prior to 1939, p. 5.

³² Kenneth Blaxter and Noel Robertson, *From dearth to plenty: The modern revolution in food production* (1995), esp. ch. 2; Paul Brassley, 'Post-war agriculture in UK', unpublished ms, talk given to MERL, University of Reading, 12 May, 2011.

³³ The war did lead to the creation of very large numbers of Domestic Poultry Keepers, but these individuals were of negligible importance in the development of the post-war poultry industry.

³⁴ Brassley, 'British farming between the wars', p. 190 estimates real grain prices fell by 50% in the inter-war period. Frank Sykes, *This Farming Business* (1944), p. 94. OECD, *Survey*, p. 163, also mentions that layers were culled after one year rather than two in the UK before the war, so increasing the supply of chicken meat, and producing a more tender meat than elsewhere in Europe. The origins of twentieth century demand for chicken meat in the UK probably lie in the mass migration of East European Jews to London before 1914, and their preference for Sabbath chicken. See Andrew Godley, *Jewish immigrant entrepreneurship in London and New York: Enterprise and culture* (2001), pp. 94-108.

³⁵ NFU, *Marketing*, p. 6.

³⁶ *Poultry Farmer*, 14 Nov. 1953.

³⁷ Geoffrey Sykes speaking to the Farmers Club, London, reported in *Poultry Farmer* 14 Nov. 1953 and confirmed by Harold Temperton in *Poultry Farmer* 15 May 1954 (Temperton was the Director of the National Institute of Poultry Husbandry, Harper Adams College). Curiously, multiple grocers also sold sausages but butchers did not. Oddy, 'Roast beef to chicken nuggets', p. 7, n. 15.

³⁸ 'New York dressed chicken' was uneviscerated chicken, and so was less perishable than eviscerated.

³⁹ The large butchers chains (Bell, Eastman, Dewhirst and the Co-operative Wholesale Society) all had large central cold storage facilities in ports, then cold rooms in their branches to manage the thawing out of carcasses. Oddy, 'Roast beef to chicken nuggets', p. 5. What became important for the poultry industry by the 1970s was the creation of major cold storage facilities in the major fishing ports along the

East Coast, notably around Grimsby. Fishing companies, especially Ross, invested in provision to cope with reduced catches. Once the infrastructure was in place, the marginal cost of freezing different products became almost trivially small. My thanks to one of the referees for alerting me to this point.

⁴⁰ Andrew Godley and Bridget Williams, ‘Democratizing luxury and the contentious “Invention of the technological chicken” in Britain’, *Business History Rev.* 83 (2009), recollections of John Maunder, p. 287. Also *Poultry Farmer* 12 June 1955 on Sainsbury’s plans. More generally see Gareth Shaw, Adrian Bailey, Andrew Alexander, Dawn Nell, and Jane Hamlett, ‘The coming of the Supermarket: The processes and consequences of transplanting American know-how into Britain’, in Ralph Jessen and Lydia Langer (eds), *Transformations of retailing in Europe after 1945* (2012), pp. 35-54, for a useful summary of Alexander’s and Shaw’s recent work on the emergence of supermarkets in the UK.

⁴¹ OECD *Survey*, p. 48.

⁴² *Poultry Farmer* 30 Oct. 1954; also 31 July 1954 on Birdseye.

⁴³ OECD *Survey*, p. 48 (for 1960 estimate); Economist Intelligence Unit, ‘Broilers: a special report’ (1963), p. 23 (for 1961 estimate).

⁴⁴ *Poultry Farmer and Packer* 14 Aug. 1963, ‘nine out of ten customers... prefer fresh [to frozen] chicken. Although it was dearer, they thought it had more flavor ... [But] frozen chicken was easier to handle’.

⁴⁵ Sue Bowden and Avner Offer, ‘Household appliances and the use of time: the United States and Britain since the 1920s’, *EcHR* 47 (1994), pp. 725-48, Table 1, p. 729 on the diffusion of refrigerators in the UK.

⁴⁶ OECD, *Survey*, p. 168 on ‘understandings’ in the UK. This is widely confirmed in various articles in *Poultry Farmer and Packer*, e.g. 31 Oct. 1959 on Sainsburys and suppliers, Geoffrey Sykes in 13 Feb. 1960, 24 Oct. 1962, p. 29 and the Economist Intelligence Unit, ‘Broilers’. See Godley and Williams, ‘Democratizing’, and Sykes, *Poultry*, for more detail.

⁴⁷ D.H. Shrimpton, *Quality control in marketing fresh poultry* (Department of Scientific and Industrial Research, Food Investigation, Technical Paper 7, 1959); also see Shrimpton writing in *Poultry Farmer*, 25 Nov. 1959.

⁴⁸ Reported in *Poultry Farmer*, 8 Nov. 1961.

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- ⁴⁹ Morales Gutiérrez, *et al*, ‘Comparative Synthesis’, contrasts the market-led co-operatives in Denmark and the Netherlands with the ideologically-led ones in Italy, France, Belgium and Portugal, for instance.
- ⁵⁰ OECD, *Survey*, p. 13. Frank Sykes, *Farming Business*, p. 95: ‘the British market is their [Dutch and Danish] chief outlet’.
- ⁵¹ OECD, *Survey*, p. 15.
- ⁵² Sykes, *Farming Business*, p. 98.
- ⁵³ OECD, *Survey*, pp. 11-16, 19. New York Dressed and the European variant, ‘Ohne Darm’, ways of presenting poultry were less perishable than eviscerated, and this was how ‘the great bulk of fowls in Europe’ were sold, OECD, *Survey*, p. 14. Professor Gerald Combe was an authority on poultry nutrition, and considered continental practices to be lagging behind those in the US and UK by some distance. *Poultry Farmer and Packer*, 22 Oct. 1960.
- ⁵⁴ ‘British broilers with Swedish strain’, in *Chicken: J. British Chicken Association* 34 (Sept-Oct. 1963), pp. 32-6. OECD, *Survey*, p. 151.
- ⁵⁵ OECD, *Survey*, p. 152.
- ⁵⁶ J. Carles Maixe-Altes, ‘Interpreting the early stages of the self-service revolution in Europe: the modernization of food retailing in Spain, 1947-72’, Munich Personal RePEc Archive, MPRA paper no. 18164, (2009), pp. 1 and 14; and Fredrik Sandgren, ‘From “peculiar stores” to “a new way of thinking”’: Discussions on self-service in Swedish trade journals, 1935–1955’, *Business Hist.* 51 (2009), pp. 734-53.
- ⁵⁷ OECD, *Survey*, pp. 48, 151-2.
- ⁵⁸ *Poultry Farmer and Packer*, 11 Sept. 1964, p. 21, on German sales, OECD, *Survey*, p. 48.
- ⁵⁹ *Ibid.*, p. 121 on the majority of sales going through voluntary chains’ self service stores. Karl Ditt, ‘Rationalisierung im einzelhandel: Die einfuhrung und entwicklung der selbstbedienung in der Bundesrepublik Deutschland, 1949-2000’, in Michael Prinz (ed.), *Der lange weg in den uberfluss* (2003), Table 1, p. 325 on growth in self-service in German food retailing. Maixe-Altes, ‘Interpreting’, n. 41, p. 24, on German voluntary chains, especially SPAR, being the leading source of expertise in all Europe on refrigeration techniques.
- ⁶⁰ Ditt, ‘Rationalisierung’, p. 327, n. 53.

⁶¹ Hans Teuteberg, 'Der verzehr von nahrungsmitteln in Deutschland pro kopf und jahr seit beginn der industrielisierung (1850-1975)', in *Archiv fur Sozialgeschichte* 29 (1979), pp. 331-88, esp. pp. 344-9 on German post war growth in poultry consumption. OECD, *Survey*, p. 11 on the low level of integration.

⁶² Talbot *Chicken war*, p. 11; OECD, *Survey*, pp. 48 and 125.

⁶³ For Denmark see *JS Journal*, Apr. 1955, p. 32; OECD, *Survey*, p. 19. On the Dutch industry, *Poultry farmer and packer*, 8 Nov. 1961, which reports the export dependency of Dutch broiler producers and fears for future. Also Arnoldus, *Family* and Tony Corley and Andrew Godley, 'The veterinary medicines industry in Britain in the twentieth century', *EcHR* 64 (2011), pp. 832-54, on the links between food Dutch processors and the UK veterinary medicines sector.

⁶⁴ OECD, *Survey*, pp. 19, 63 and 144-8. According to *Poultry World* 30 Aug. 1973, profits in the Dutch and Belgian broiler industries were still relatively low compared with Italy and France.

⁶⁵ *Poultry Farmer and Packer*, 4 June 1960, 'Danes have lost their lead over the British in the broiler industry'; and Table 1.

⁶⁶ *Ibid.*, on machinery; also Alessandra Tessari, 'The growth of the Italian poultry industry: The case of Arena Company, 1957-1980', (unpublished ms, 2012), pp. 37-47 on machinery, and pp. 58-59 on Stork.

⁶⁷ French birds were slow growing, three months typically, and farmed in small flocks of 50-100 birds. One quarter of French output went via Les Halles in 1961, OECD, *Survey*, pp. 15 and 107-9.

⁶⁸ *Ibid.*, p. 110.

⁶⁹ *Ibid.*, p. 109, Tessari, 'Growth', p. 49. Gilbert Noel, 'l'engagement de l'Etat en faveur de la modernisation agricole et du developpement rural en France (1950-1970)', unpublished paper given to Third meeting of Franco-British rural history societies, Rennes, 18-20 Sept. 2008. This deals generally with the debate surrounding attempts to improve agricultural productivity, of which poultry was one sector in need of modernization. In conversation with the author, Professor Noel kindly provided the additional information reported here.

⁷⁰ OECD, *Survey*, pp. 109-11.

⁷¹ On expensive French eggs and meat, see *Poultry Farmer and Packer*, 19 Sept. 1962, p. 28; and their producers being 'sacrificed' to the EEC, *Poultry Farmer and*

Packer, 11 Mar 1964, p. 10. On Dutch imports in France see OECD, *Survey*, pp. 117. Sun Valley opened a French subsidiary by 1963 (Tessari, 'Growth', p. 34) and Rupert Chalmers Watson was reporting the beginnings of UK exports to France in 1961, despite the 15-20% tariff into EEC countries (*Poultry Farmer and Packer*, 18 Oct. 1961).

⁷² Oddy, 'Roast beef to chicken nuggets', p. 5.

⁷³ OECD, *Survey*, p. 111, on Sociétés d'Entrepôts Frigorifique.

⁷⁴ *Ibid.*, p. 135. There were already 20,000 commercial chicken farmers in existence in Italy in 1961.

⁷⁵ Maixe Altes, 'Interpreting', p. 1; Emanuela Scarpellini, 'The long way to the supermarket: Entrepreneurial innovation and adaptation in 1950s-1960s Italy', in Jessen and Langer (eds), *Transformations*, pp. 55-70.

⁷⁶ Oddy, 'Roast beef to chicken nuggets', p. 5.

⁷⁷ Tessari, 'Growth', Table 6, p. 20. I am deeply indebted to Dr Tessari for additional information on Italian developments gleaned through many a happy hour of conversation and email correspondence.

⁷⁸ OECD, *Survey*, p. 136 - not including UK here in 'other European'. Tessari, 'Growth', pp. 13-15.

⁷⁹ Andrew Godley and Alessandra Tessari, 'Made in Italy. Made in Britain. Quality, brands and innovation in the European poultry market, 1950-1980', *Business Hist.*, DOI:10.1080/00076791.2013.850672. Published online- 11th February, 2014; OECD, *Survey*, p. 141. Nichols birds had 68% of the market in 1960, *Poultry Farmer and Packer*, 9 Mar. 1960. Corley and Godley, 'Veterinary Medicines', on the US pharmaceuticals firms subsidiaries operating in UK, including those with sales in Italy such as Elanco, Pfizer and Merck.

⁸⁰ *Poultry World*, 24 Aug. 1972, pp. 16-17 on Bibby's acquisition of CipZoo. In 1973 Slater Walker acquired almost one quarter of Bibby & Co stock, signaling its subsequent break up and Cip Zoo's liquidation, *Poultry World*, 26 July 1973, p. 9.

⁸¹ The following is based on Ernesto Clar, 'A world of entrepreneurs: the establishment of international agribusiness during the Spanish pork and poultry boom, 1950-2000', *Agricultural Hist.* 84 (2010), pp. 176-94; and *id.*, 'Was Spain different? Agricultural change in Spain in a southern European perspective, 1961 to 1985,'

AgHR 61 (2013), pp. 330-50. I am also indebted to Dr Clar's email correspondence with me, 11 July 2013.

⁸² Maixe Altes, 'Interpreting'.

⁸³ A remarkable prophetic statement, made even more noteworthy by observing that the only correction that subsequent events would introduce would be that it was not either processors or retailers but both together that organized and controlled the sector. *Poultry Farmer and Packer*, 13 Feb. 1960.

⁸⁴ *Poultry Farmer* 26 Feb. 1955 contrasted with 19 Nov. 1960: 'Wanted a Ministry of Agribusiness'.

⁸⁵ Andrew Godley, 'Entrepreneurial opportunities, implicit contracts and market making for complex consumer goods', *Strategic Entrepreneurship J.* 7, (2013) pp. 273-87; and Andrew Godley and Mark Casson, "'Doctor, Doctor ...': Entrepreneurial diagnosis and market making', *J. Institutional Economics* 10 (2014), doi:10.1017/S1744137414000162. Published on-line May 13th, 2014.

⁸⁶ In April 1960 *The Grocer* (2 Apr. 1960) was reporting that 65,000 food shops in the UK had deep freezer cabinets – this when the number of self-service food outlets (a proxy for those above a certain size) was only 11,000. This meant that households had less need for domestic refrigeration than elsewhere, because the shopkeeper 'is every housewife's cold store' (*Poultry Farmer* 25 Jan. 1958), perhaps explaining why the diffusion of domestic refrigerators among British households was relatively low.

⁸⁷ French costs from OECD, *Survey*, p. 112. UK costs from Economist Intelligence Unit, 'Broilers', p. 24.

⁸⁸ Obvious candidates being Major Antony Fisher, creator of Buxted, and Lt Col Corbett, creator of Sun Valley. But there were many other less well known ex-military figures. My thanks to Peel Holroyd for raising this point.

⁸⁹ OECD, *Survey*, p. 11.

⁹⁰ The significance of department stores is highlighted in Andrew Godley and Haiming Hang, 'Globalization and the evolution of international retailing: a comment on Alexander's "British Overseas Retailing, 1900-1960"', *Business Hist.* 54 (2012), pp. 529-41.

⁹¹ Tessari, 'Growth', reports that only 1,000 shops had freezer cabinets in Italy in 1960, Table 33, p. 134. Compare with the British case in n. 86 above.

⁹² FAO Corporate Depository, *Animal Genetic Resources of the USSR* (no date, c. 1985), ch. 13. (<http://www.fao.org/docrep/009/ah759e/ah759e22.htm>, accessed 25 Apr. 2014). This states ‘For meat production the prevailing stocks are the four-line crosses Broiler-6 and Broiler-compact-8 which have been formed from Dutch lines of the Evribreed firm’. (I have not been able to locate evidence of such a firm.) The source goes on to state that the feed conversion rate of Soviet cross-bred broilers in 1984 was 2.8. This would be less than half the feed conversion rates obtained across the US and West European poultry sectors at that date.