

Globalisation in Practice: On the Politics of Boiling Pigswill

John Law* and Annemarie Mol¹**

*(until March 31st 2010) Department of Sociology, Lancaster University,
Lancaster LA1 4YN, UK (j.law@lancaster.ac.uk)
(from April 1st 2010) Department of Sociology, Faculty of Social
Sciences, The Open University, Walton Hall, Milton Keynes MK7 6AA

**Department of Social and Cultural Anthropology, Amsterdam
University, De Boelelaan 1081, 1081 HV Amsterdam, the Netherlands
(A.Mol@uva.nl)

13th August 2006; boiling pigswill 29bw.doc

This paper is in draft form. You are welcome to cite it, but please reference it appropriately – for instance in the following form:

John Law and Annemarie Mol, 'Globalisation in Practice: On the Politics of Boiling Pigswill', version of 9th April 2009, available at <http://www.heterogeneities.net/publications/LawMol2006GlobalisationinPractice.pdf>, (downloaded on).

¹ We are grateful to Nick Bingham and Steve Hinchliffe, as well as various reviewers for their comments and suggestions. We would also like to thank Vicky Singleton and Sue Wrennall for conversations about farming, Andrew Barry for his inspiring criticism, Mieke Aerts for her encouragement, and the staff of the Library of the Harper Adams College, Newport, Shropshire, UK, for help in the research leading to this paper.

Globalisation in Practice: On the Politics of Boiling Pigswill

Abstract

This paper is about ‘material politics’. It argues that this may be understood as a material ordering of the world in a way that contrasts with other and equally possible alternative modes of ordering. It also suggests that while material politics may well involve words, it is not discursive in kind.

This argument is made for the mundane and material practice of boiling pigswill that the 2001 UK foot and mouth outbreak showed to have a layered importance. Boiling pigswill was a political technique in at least three different ways. First it made difference, dividing the rich from the poor by separating disease free countries from those in which foot and mouth is endemic. Second, it joined times and places by linking past agricultural practices with those of the contemporary world, and linking Britain with the world. And third, it also showed a way of limiting food scarcity on a world wide scale because it allowed food to be recycled, albeit on a small scale, in a region of plenty.

‘Politics’ is often linked to debate, discussion, or explicit contestation. Alternatively, it is sometimes seen as being embedded in and carried by artefacts. For the case of boiling pigswill neither approach is satisfactory. The first privileges the life of the mind while in the second politics is linked too strongly to a single order. The version of politics presented here foregrounds both materiality and difference. And it involves articulation: the question is not whether something is political all by itself but whether it can be called political as part of the process of analysing it.

Keywords

Politics, globalisation, materiality, foot and mouth disease, political theory

Globalisation in Practice: On the Politics of Boiling Pigswill

This article starts at a specific location: Burnside Farm at Heddon-on-the-Wall in the North East of England in 2001. Or, more specifically still, it starts with a large green tank on this farm, close to the road. This tank has had at least three different lids in the recent past, though when this story begins there is no sign of any cover at all. The tank holds swill for the pigs, old stale swill. The pipes that lead from the tank to the sheds where the pigs are raised have been out of order for months. When it is time to feed the pigs, the swill is carried to the sheds in buckets.

There is a problem with the swill on this farm, or so Jim Dring finds on a late winter day in that year of 2001. It is cold and snow is coming. Dring is a Veterinary Officer for MAFF (the Ministry of Agriculture, Fisheries and Food) based at the Ministry's Office in Newcastle. He has gone to Burnside Farm to check out the pigs. After a gap of nearly 25 years foot and mouth disease (FMD) has come back to the United Kingdom. It has been found in Essex in the south of England, in a slaughterhouse. It must have arrived there carried by an infected animal. To track this animal down, Dring and his colleagues all over the country have been visiting hundreds of farms.

Where did the infected animal came from? Dring is about to solve the puzzle, for he has just discovered that most of the pigs at Burnside farm have, or have had, foot and mouth disease. Once he has reported his findings, it quickly becomes clear that he has discovered the 'index case', the site where the epidemic started. This is how the Ministry's official report will later put it:

‘Although the first FMD outbreak was confirmed in pigs in an abattoir in Essex on 20 February ... the origin for that outbreak, and the index case for the whole epidemic, is considered to have been a pig finishing unit at Burnside Farm, Heddon on the Wall, Northumberland ... which was licensed to feed processed waste food under the Animal Byproducts Order 1999.’²

Over the next seven months six million animals in the UK will be slaughtered in the attempt to eradicate the disease.³ This slaughter will cost £3bn and also lead to huge if unquantifiable levels of suffering and grief.

How did the pigs on Burnside Farm catch foot and mouth disease? The evidence remains circumstantial, but the vets will argue that the virus that infected the pigs was carried in their swill. This swill consisted of waste food from catering kitchens. The waste food should have been processed but it is likely that the processing was not being done properly. In particular, it is likely that the swill had not been boiled. Thus illegal meat imports carrying living virus from a region of the world, perhaps Asia, where foot and mouth disease is endemic, were probably fed directly to the pigs which then contracted the disease. Thus pigswill made distant places present in the Burnside Farm and

² Department for Environment, Food and Rural Affairs (2002,3).

³ The disease was also carried with livestock exports to France, the Netherlands and the Republic of Ireland, though in these countries the outbreaks were contained and very limited. Precautionary slaughtering of animals also occurred in Belgium, Spain, Luxemburg and Germany, but no cases of the disease were confirmed.

made Burnside Farm relevant far beyond its limited physical boundaries. This turns it into a good case (one of many that are equally intricate and banal) for studying how globalisation comes about, how it works, what it is. In practice.⁴

The story of Burnside Farm as the index case of a major epidemic has been told a number of times⁵. We retell it here not because we have any new suggestions about how to prevent another outbreak of foot and mouth disease, but because, more theoretically, the travels of the foot and mouth virus afford us an insight both into the tortuous links and the gaps between geographical sites. Pig feed also helps us to explore how long distance associations coexist with boundaries and dissociations; and the way in which things flow or get held up.⁶ The literature about the present dis-connected state of the earth is rich, but we would like to add something to it: an analysis of a geo-logic (a geo-logic that is also an anthropo-logic and a techno-logic) of connecting and disconnecting; of linking and differentiating while foregrounding the material specificities of our geographically dispersed site. We set out to articulate some of the material politics at work.⁷ Some of the ways in which politics, contestatory or otherwise, is caught up in and reproduced in material arrangements. And some of the ways in which the articulation of politics, its enactment in words, relates to and is embedded in non-discursive material practices.

Articulating the material politics at work in globalisation is a double task. This is because it requires us to talk not only about what is going on that might be called ‘political’ in the quite specific material relations we study, but also, and simultaneously, to specify the theoretical terms that are mobilised as we talk. What might a phenomenon deserving the name ‘material politics’ be – what shapes does it take, how might we go about understanding it? And here there are two notions of ‘politics’ that we might try to mobilise.

The first, from the field of Science and Technology Studies (STS), is exemplified by the sleeping policeman. Made out of stone or cast in tarmac, this figure has a silent but authoritarian capacity to regulate the behaviour of car drivers⁸. It slows them down. It doesn’t work through words or rules, or with the threat of a fine. It doesn’t work through meanings. Instead it acts physically. Driving too fast over a sleeping policeman will damage the car and may hurt the driver. These physical effects give sleeping policemen the capacity to govern. They are a truly material political technique. But as an image for what a ‘material politics’ might be, sleeping policemen also have a drawback. They are singular, unified, closed off. They do not seem to leave much space for opposition, otherness, for alternative modes of being. They incorporate only one mode of ordering, not many.

The second relevant notion of politics, from political philosophy, is exemplified by the gathering of citizens who discuss and debate issues. They engage in a dispute. Here differences are opened up rather than closed off. Everyone is

⁴ See Franklin, Lury and Stacey (2000).

⁵ See, for instance, Foot and Mouth Disease 2001: Lessons to be Learned Inquiry (2002), Department for Environment (2002), The Royal Society (2002), Woods (2004) and Law (2006).

⁶ See, for instance, Massey (1999).

⁷ About the way technologies may be involved with politics, see especially Barry (2001).

⁸ Latour (1998, 187-188).

free to have a say in the matter, and differing arguments are piled on top of one another. Here politics is equivalent to what Hannah Arendt called ‘action’⁹. There is respect for otherness and for the novelties that may emerge from a dispute between open minds. At the same time, however, materialities are kept out. In her writing Arendt carefully sought to disentangle ‘action’ from the ‘work’ of the craftsmen and the ‘labour’ of those engaged in food production and other activities to do with immediate survival. She was convinced that material tasks bind humans too closely to necessities to leave room for the inventions made possible by ‘action’.

In the first of these notions of ‘politics’ is linked too strongly to a single order, whilst the second privileges the life of the mind over the stubborn obduracy of the material. Neither is up to the task of theorising ‘material politics’. As we tell the story of Burnside Farm we hope, therefore, to start to articulate a third possibility, one that simultaneously foregrounds the relevance of materialities, while making it possible to explore differences and alternative modes of being.

Global relations between a variety of earthly inhabitants surface in the events at Burnside Farm. We learn about what we will call the metabolic relations between: the foot and mouth virus (which lives in and on animals, including pigs); pigs (that have to eat in order to live); and people (who need food, too, and who may or may not eat pigs). These all come together in the technique that we explore: boiling pigswill. Boiling pigswill, we will suggest, is a political technique. It works to draw the world together while simultaneously helping to divide it. In this respect it is no different from a whole range of other techniques that assemble and divide the world: the mass movements of people seeking to survive, the money transfers of immigrants to their home countries, the capital investments of large companies, passports, the internet, the uses of military power, and so on. So what is the specificity of boiling pigswill? And what are its others, its alternatives, better or worse? What, in short, is the material politics at stake when pigswill is being boiled – or not?

Making boundaries

The Burnside tenants, Ronnie and Bobby Waugh, collected waste from catering establishments around Newcastle. They delivered it to the edge of the farm. Then they took it – or they were supposed to take it – to a neighbouring farm for heat treatment. This is what British law said at the beginning of 2001.

‘Catering waste shall be processed for at least 60 minutes at a temperature of not less than 100°C or by an alternative method specified in the approval.’¹⁰

Next door at Heddon View Farm there was a processing unit. The Wauchs were supposed to boil their swill in that unit for an hour, and then bring it back to Burnside in a different set of containers. Then they could feed it to their pigs.

⁹ Arendt (1958).

¹⁰ Statutory Instruments 1999 No. 646 (1999, Schedule 5: Requirements for Premises Processing Catering Waste).

So this is boiling pigswill. It makes boundaries: between untreated and treated waste food; and between pigs on the one hand and bacteria and viruses (the foot and mouth virus is just one of these¹¹) on the other. Boiling helps to keep bacteria and viruses out of the pigs. This doesn't mean that it cleans the swill in other, shall we say aesthetic, ways. Catering waste smells grim before it goes into the boiler, and it still smells grim after it comes out. In the process an unpleasant and lumpy mess is turned into a grey slurry with a slimy consistency. Even those used to this business do not find it appealing.

Jim Dring was involved in patrolling these boundaries:

'It was my practice to visit [Burnside and Heddon View Farm] ... one after the other, towards the end of each January, to inspect for renewal of Brown's [Heddon View] processing licence and Waugh's Article 10/26 licence.

Brown would receive additional waste food-related visits through the year by MAFF technical staff, though none routinely from me. Waugh, because an Article 26 licence holder, would receive an additional visit from me, usually towards the end of July, for the purposes of clinical inspection, but no other routine MAFF visit.'¹²

So the vets regularly visited the farm to inspect it. This has to do with another boundary: a legal one. Two in fact: a boundary that distinguishes between those licensed to feed swill to their pigs and those who are not; and also (differently) between those who are allowed to boil that swill, and those who are not. These legal boundaries could only be maintained if the practices of boiling catering waste were inspected. The vets had to establish whether the farms still deserved their license. To patrol one boundary (between licensed and unlicensed farms) was thus to patrol the others (between untreated and treated catering waste, and between pigs and bacteria or viruses). However, as we know, in the present case the inspections were not enough. There were leaks. Indeed, more than leaks, there was a flood. But this only became clear after the event. Jim Dring:

'There was ... evidence of cutlery in the pig troughs and pens at Burnside Farm. Catering waste normally contains some cutlery but it would be unusual for this cutlery to survive the processing operation and end up in the processed waste fed to livestock.'¹³

The investigators found 1,300 pieces of cutlery on site, together with two ash trays and Chinese crockery (the latter together with a lot of the cutlery, were retrieved from the bottom of the green tank¹⁴.) All this suggested that the Waughs were not just occasionally breaking the rules about boiling swill, but were doing so systematically. Indeed, perhaps it was unboiled (and therefore lumpy) swill that had caused the piping system to fail months before. At any rate, the practices of the Waughs led to a systematic boundary failure.

¹¹ Others include trichinellosis. For a study of the epidemiology in contemporary China see Liu and Boireau (2002).

¹² Dring (2001, 10).

¹³ Department for Environment Food and Rural Affairs (2002, 19).

¹⁴ Dring (2001, 16-17).

But the character of the leak was not just a function of the leak itself. It was also a consequence of where the catering waste was coming from, and what it contained.

'The waste food for Burnside Farm's pigs was collected from a number of restaurants, hotels, schools, bakeries and an armed forces establishment in the north-east of England by the tenants and two other collectors using their own vehicles.'¹⁵

Somehow something in this waste food was carrying the virus. Almost certainly this was meat.¹⁶ Officially, if the law had been obeyed, infected meat would not have been in the waste food the collectors picked up at the back doors of the kitchens of the north-east of England. This is because the World Trade Organisation (WTO) only allows particular countries to trade freely in meat.

'To trade freely in animals or animal products, a country must be able to demonstrate that it is free from certain diseases. Any OIE Member State wishing to obtain recognition of freedom from a disease must demonstrate that it has:

- a reliable disease surveillance and reporting system,
 - a reliable disease control and eradication programme, and
 - a state veterinary service with independence and integrity.'
- ¹⁷

The OIE is the Office Internationale des Épizooties. It sets the WTO rules about which countries can trade in meat, and where they can sell it. These rules are meant to keep 'disease free' countries, indeed, free of disease. They allow a British farmer to export his pigs anywhere. But under these same rules many other farmers are not allowed to sell their animals to the highest bidder if this bidder is in the wrong place. For instance a Chinese farmer cannot send his trotters to Newcastle even if there is a price differential. Not legally. However, the price differential makes illegality appealing.

'The price of a kilogram of meat in the markets of Istanbul was five times that on the Eastern border areas of Iran during that [1998-2000] period; this demand gradient, coupled with improving political relations between Turkey and Iran as well as improved road infrastructure, led to an increase in trade, often illegal.'

¹⁸

Thus price differences invite trade across the boundaries drawn by the WTO on geographical maps. This makes it exceedingly difficult to keep viruses out at the borders of 'disease free countries'. Too difficult, in fact, even for an island like Britain.

¹⁵ Department for Environment Food and Rural Affairs (2002, 18-19).

¹⁶ The virus may be carried by fodder or people if they have been in close contact with infected animals; but outside an infected animal it gradually dies (the hotter and dryer it is, the more quickly this happens). It may also be transported by the wind: a number of farms round Burnside were directly infected from the plume of virus from its pigs (which emit it in huge quantities).

¹⁷ The Royal Society (2002, 40).

¹⁸ The Royal Society (2002, 44).

'We have somewhere round about 2.5 million containers coming into this country every year, and to open all of those would not be a practical proposition.'¹⁹

So the ports leak, and so too do the airports.

'We have evidence that illegal importations of meat, meat products and fish occur on a regular basis in personal baggage from a number of countries. Searches in the past year have revealed significant quantities of meat from Ghana and Nigeria. Smaller quantities of higher value meat and products have been found on flights from China and Malaysia.'²⁰

At ports and airports they do their best to stop viruses from entering the 'disease free' parts of the world. Customs officers open containers and luggage, and they inspect documents. Sometimes someone is taken to court. But everyone knows that all the work put into maintaining the law, is bound to fail.

'Illegal shipments on a commercial scale are ... likely to be intended for wholesale outlets or sale to restaurants or canteens. These are ... likely to be refrigerated and illegally described as food or dried, cured or salted and presented as non-food imports. This increases the chance of the virus getting into catering waste which if not properly cooked before feeding to livestock could reach pigs in sufficient quantities to cause disease.'²¹

This is why pigswill must be boiled. Boiling is meant to maintain the boundary between the regions of the world free from foot and mouth, and those that are not. This boundary making is far more complex cartographically than the traces it leaves on a map. Indeed, the techniques most central to it are not located at geographical borders at all. Instead they are dispersed across the map – and found in places such as farm outhouses where catering waste is being treated. Where pigswill is being boiled.²²

Why bother with all this boundary work?

'All the professionals associated with the livestock industry that we consulted believed that a major outbreak of FMD would be disastrous for animal productivity within the highly developed livestock production systems of Europe, Australasia and North America. The evidence to support this opinion is necessarily limited because FMD has always been eradicated in these areas before it has reached an endemic state. As a result, quantitative information is sparse but overall direct losses in livestock productivity have been estimated at 25% due to reduced growth rate and decreased milk yield.'²³

¹⁹ House of Commons Select Committee on Environment Food and Rural Affairs (2001, Answer from J. Scudamore to Question 36).

²⁰ Department for Environment Food and Rural Affairs (2002, 19).

²¹ Department for Environment Food and Rural Affairs (2002, 5).

²² For a graphic account of the complexity of this boundary see the post-2001 risk assessments produced for DEFRA. For instance, Department for Environment Food and Rural Affairs (2004).

²³ The Royal Society (2002, 18-19).

So here's a reason. To boil pigswill at Heddon on the Wall is to reproduce a distinction between a productive and a less productive agriculture. It is also a technique for making and maintaining a specific geographical distribution of that productivity. For instance, in Bangladesh foot and mouth is common, and when it strikes:

'The capacity of buffalo herds to work during rice planting is halved, and milk yields decrease by 80%. When endemic, infections often occur serially with some herds falling ill three times a year. The livelihoods of families that depend on animals for food and power can be severely affected.'²⁴

Thus when the boundary between disease free countries and countries in which foot and mouth is endemic is being drawn, this also distinguishes between an agriculture that is highly productive and one that is much more likely to fail. Thus a division is made. The world is divided into two. The North and the South again? Well, not quite. The relevant boundaries do not neatly coincide with those of the other North-South divisions around – even if there are striking overlaps. A specific variant of affluence is separated out from a specific variant of poverty. This time these are the specificities: 'disease free countries' are separated from 'countries where foot and mouth is endemic'.²⁵

Thus, the story of Burnside Farm illustrates that the political techniques for creating and maintaining the great divide between the rich and the poor parts of the world take on a variety of material forms. These techniques may be found far beyond the state and its infra- and supra-national institutions, in such unlikely sites as farms and their outhouses.²⁶ Pigswill may smell nasty, it may be mundane, but it is also crucial to the specific way in which the globalisation of the pig trade has taken shape. And this is the reason for our first conclusion: boiling pigswill is a political technique for making difference. It protects the rich from the poor. It divides disease free countries from countries where foot and mouth is endemic.

Making links

As a result of the foot and mouth outbreak, feeding pigs with swill from catering waste was made illegal in the UK on 24th May 2001²⁷. This put an end to an English history of human-pig intimacy – let us call this a metabolic intimacy²⁸ – that goes back at least 500 years. Look at this:

²⁴ The Royal Society (2002, 19).

²⁵ Might it not be that the fact that each North-South division does not quite overlap with the next makes them, jointly, stronger, more tenacious, harder to undo, than if there were a single clear-cut division? At the end of 2004 north and central America, most of Europe (with the exception of Russia, Byelorussia and Serbia-Montenegro), Australia, New Zealand, Japan, South Korea and Indonesia, plus Malagasy, Chile and Guyana are countries that are foot and mouth free without vaccination. This means that most of Asia, Africa and South America do not have this status, though parts of some countries in these areas are declared foot and mouth free without vaccination. See Organisation Internationale des Épizooties (2004).

²⁶ The lesson about material politics that is situated in places that are not quite 'the state' comes from Foucault. See, for instance, Foucault (1979).

²⁷ Foot and Mouth Disease 2001: Lessons to be Learned Inquiry (2002, 49).

²⁸ One of the anonymous referees of this paper notes that the root of the word 'metabolism' points to transformation and change, and suggests that the term 'trophic' (meaning the flux of

'Dearly Loved Children
Is it not a sin
When you peel potatoes,
To throw away the skin?
For the skin feeds pigs
And pigs feed you.
Dearly loved children,
Is this not true?'

We can't find a good source for this rhyme – though one of the present authors learned it as a child. However, it feels Victorian or Edwardian. As it teases the pomposity of the Church of England it simultaneously evokes a romantic version of metabolic intimacy in which people, cottage dwellers, ideal-typical Victorian rural labourers, fed pigs with their kitchen waste, and subsequently fed on them in turn. But this is not simply a romantic story. Many families kept a pig on an annual cycle²⁹. A piglet was bought in spring and lived in a sty in the garden. It was fed the family's kitchen waste and got more or less friendly with the family members. And then, as it got bigger, it was fed on potato tops, swedes and boiled potatoes from the garden. Family members might collect other food from the lanes: sow thistles, snails, dandelions. Then the pig was fattened off with some bought-in barley meal. And finally it was slaughtered in a ceremony, usually in November, which culminated with everything, absolutely everything from the pig, being consumed one way or another by the family, the neighbours, and the slaughterman.³⁰

There were lots of cottage pigs in Victorian and Edwardian England. And though the cottage pig had disappeared from England by 2001, the practice of feeding pigs with catering waste is an extension of this history. There have, to be sure, been changes along the way. The most important has to do with scale. Burnside Farm may still have been practising a human-pig-human metabolic intimacy, but the scale was industrial, not domestic. Jim Dring:

'The Burnside herd at this time comprised 527 pigs, with culled adults and pork/bacon pigs in approximately equal numbers alongside a lesser number of young stock.'³¹

527 pigs. There is no way this was a small-scale operation. It was an industry and a stratified one, too. The Waughs did not breed pigs, but regularly bought them from breeder units. This is why theirs was a herd of 'culled adults and pork/bacon pigs'. As a 'finishing unit' their task was to fatten those pigs up for slaughter. Then they sold them on, indeed for slaughter, to a single abattoir in Essex. Thus, it was not just the family, the neighbours and the slaughterman who ate these pigs. Instead they were moved into the market. Smaller pigs

energy within a community of species) or, and more straightforwardly, 'nutritional' might be more appropriate. We are, indeed, primarily interested in the trophic, but prefer to stick with the term 'metabolic' since it has wider currency.

²⁹ See Wiseman (2000), and especially Malcolmson and Mastoris (1999).

³⁰ There are many accounts of the English cottage pig. In addition to Malcolmson and Mastoris (1999, 50) see also Thompson (1973, 26).

³¹ Dring (2001, 2).

were being sold for UK consumption, while large cull sows and boars were probably being slaughtered for export to German sausage makers.³²

To feed so many pigs the Waughs needed to collect waste food from more than a few establishments. Their paperwork was sloppy so Dring couldn't determine exactly where the food came from. Even so, he knew that:

'The waste food for Burnside Farm's pigs was collected from a number of restaurants, hotels, schools, bakeries and an armed forces establishment in the north-east of England by the tenants and two other collectors using their own vehicles.'³³

Catering waste is food that didn't make it into the stomachs of people. In some cases, like potato peelings, it didn't make it to the table at all. But it still owes its existence to human food practices. It is food that was grown for human consumption but didn't actually get eaten. At which point there are two main options: one, to bury it in a landfill site; or two, to arrange for it to be collected and fed to the pigs.

It may have been cheap for the Waughs to collect catering waste. This is almost certainly why they fed their pigs in that way, even though it was labour-intensive. But the practice would not exist at all in places where most people faced the scarcity evoked in the mock-sermon rhyme above. Instead it depends on a local economy of metabolic surplus. There are different and widely divergent calculations, but estimates suggest that anything between £386m and £20bn worth of food is being thrown away in the UK each year, and that 30-40% of the food bought is never eaten³⁴. It is such excess that allowed the tenants of Burnside Farm and their two employees to collect enough catering waste to feed 527 pigs. Pig swill feeding on this industrial scale would not, for instance, be possible in large parts of Brazil, even though there are a lot of pigs (32 million of them³⁵) in that country.

Thus there have been many changes along the way as English pig-rearing has shifted from the practice of keeping a pig in the garden of the family cottage to its current industrial incarnation. Yet despite such changes the Waughs were still practising an English metabolic tradition. A tradition of actually using waste. Of not letting it 'go to waste' in landfill sites. Sticking to this tradition in its new industrial context was only possible because of a specific practice: that of boiling pigswill. Even when swill was composed of the leftovers of a single family boiling was recommended, but it was much less important. In any case, for much of the period of the cottage pig, foot and mouth disease was endemic in Britain³⁶. But at the very time that the idea that this disease could be eradicated started to develop, farms were also

³² Where did the meat and the sausages go from there? This is a question of connections and boundaries in its own right. For while German sausage may be eaten in Italy or back in the UK, they are not going to be exported to Algeria, Egypt, or Israel where 'pigs' are not on the menu. Food prohibitions turn pigs into food in a particularly interesting way for those of us interested in metabolic flows and blockages. But we won't develop this in the present article, which attends to what pigs eat rather than by whom they are eaten.

³³ Department for Environment Food and Rural Affairs (2002, 18-19).

³⁴ Rimmer (2003); BBC(2005).

³⁵ Food and Agriculture Organization (2004).

³⁶ See Woods (2004, plate 1). Note that boiling helped to prevent all sorts of other disease in pigs.

increasing in size. They needed more waste food for their pigs and therefore started to collect this from a wider area. While the food being eaten in this area came from the four corners of the earth.

As part of its imperialist organisation of trade, late nineteenth century Britain imported raw materials and exported manufactured goods. It also imported an increasing proportion of its food. Cereals (more on these below), but also meat. The meat came from continental Europe; New Zealand; Australia; and various south American countries, including especially Argentina (where it was of major economic importance, and involved substantial British investment). With the development of refrigeration, in the 1890s these imports might take the form of frozen meat, chilled meat, or live animals.³⁷

The question as to whether these imports carried infectious diseases (and more particularly foot and mouth disease) led to contentious economic, political, and veterinary debate. The overall history of foot and mouth epidemiology is not entirely clear (did it exist at all before the eighteenth century?) but in the UK there were major epidemics between 1870 and 1885, and again throughout the 1920s. Imports of live animals from the Argentine (where the disease was endemic) were halted for periods after 1900 amidst considerable controversy. Not meat imports, however, for these continued to grow (Argentina exported over 400,000 tons of meat in 1921).

In the 1920s veterinary investigations suggested that at least some of the outbreaks in the UK were caused by meat imports. However only meat imports from continental Europe were banned. There are several explanations for this. The UK depended economically on Argentine imports: these provided cheap meat for its urban industrial population while British economic interests were involved in the trade. But there was also a double scientific rationale: one, it was argued that frozen or chilled meat from distant countries was less likely to transmit the disease than the fresh meat that was more quickly imported from countries closer to the UK; and two, the disease was actually less widespread in the Argentine than in continental Europe. Even so, there was considerable controversy,³⁸ a controversy that was exacerbated by veterinary science claims in 1927 and 1928 that the virus was capable of surviving for long periods in bone and blood. It was at this point that the UK government acted: with the FMD Boiling of Animal Foodstuffs Order³⁹ it became illegal to feed pigs with untreated swill. People could eat imported meat – they would cook it, and in any case could not contract the disease. But it was essential to boil any meat before the virus could reach pigs – and, through them, cattle and sheep. So the order stipulated that swill should be boiled for sixty minutes. Made at a moment when Britain sought to combine the advantages of long distance trade relations with the eradication of foot and mouth disease, this is the rule that was flouted by the Wauchs nearly eighty years on.

³⁷ From Woods (2004, 51ff).

³⁸ Woods (2004) shows that for many farmers, even in the twentieth century, foot and mouth disease was part of life. The farming community was deeply divided about the attempts to eradicate it entirely from national livestock.

³⁹ Woods (2004, 58).

Globalisation is often described as if it were a matter of a set of Western networks that spread out to colonise distant places. But the business of making connections, imperialist or otherwise, also profoundly changes the so-called West. Its traditions are adapted to their new surroundings. In the present case the tradition of metabolic intimacy between people and pigs was changed to fit both the industrial scale of pig-rearing and the networks of long distance trade. It was changed in a simple but crucial way: by the technique of boiling. Rearing pigs on an industrial scale in a world of long distance trade could still co-exist with feeding those pigs with pigswill, but only if the swill was properly boiled. Thus boiling pigswill was not simply instrumental in eradicating foot and mouth disease in Britain. It was also a way of holding tradition and modernity together. A way of combining Englishness with global domination. This, then, is our second lesson. Boiling pigswill is a political technique that links up times and places. It links old times with modern times; and England with the world.

Except that we should not put this in the present tense. For as we have seen, after 24th May 2001 feeding pigs with swill from catering waste was no longer legal⁴⁰. This was, to be sure, the final coup de grace for this old tradition. It had been in decline for a long time, and very few pig rearers were still collecting catering waste at the time of the epidemic.⁴¹ Nevertheless, the moment is significant. If catering waste is not used to feed pigs then it does not need to be boiled either. The boundary between countries free of foot and mouth and countries where it is endemic is no longer kept by boiling pigswill but by forbidding it. In the process, the old tradition of metabolic intimacy between people and pigs is finally done away with – while both global links and a division between an agriculture that is consistently productive and one that is much more erratic are maintained.

All waste food is now dumped as landfill. Do we still have the words we might need to call this a sin?

Whose food?

The British reaction to foot and mouth disease was to kill all the animals that might possibly carry the virus⁴². The animals on Burnside Farm were among the first to be condemned, slaughtered and burned. But even in an advanced economy it takes a few hours to organise mass slaughter, and in the meanwhile those pigs were hungry. Jim Dring:

'I ask Waugh how he intends to feed his pigs between this time and their eventual slaughter. He replies that he has no processed swill to offer them and proposes feeding either unprocessed swill (of which he has plenty, in barrels, on the back of his lorry) or proprietary bagged meal, of which he has none, and would therefore necessarily need to leave the site to go and buy, and to which the pigs would in any case not be accustomed. I tell him

⁴⁰ Foot and Mouth Disease 2001: Lessons to be Learned Inquiry (2002, 49).

⁴¹ Foot and Mouth Disease 2001: Lessons to be Learned Inquiry (2002, 49).

⁴² Vaccination was also considered in various strategic variants. See The Royal Society (2002).

to feed the unprocessed swill, which his employee (David Hall) proceeds to do.⁴³

So there are two options: swill or meal. But the Waughs deal in swill. They have no meal. Since Jim Dring does not want to risk the virus spreading with someone leaving Burnside Farm to go to the local agricultural supplier, he opts for swill. But he notes these facts because the Waughs' pigs were unusual. As we have just noted, few pigs were being fed catering waste in 2001. Indeed:

'... only 1.4% of the pig population in Great Britain were fed swill. Most domestic and catering waste was disposed of in licensed landfill.'⁴⁴

So even before the final rupture with the human-animal metabolic intimacy of 2001, that intimacy had largely disappeared. But what do pigs eat if they don't eat swill? Apart from meal (to which we will return shortly) many British pigs eat potatoes. Indeed many British pigs have been eating potatoes for the last 150 years. In the 1870s:

'in Lancashire and Cheshire and in the south-west pigs were kept on dairy farms and fed with whey and skimmed milk; in East Anglia they were found on mixed farms and fed with cereals, skimmed milk, potatoes, peas and beans.'⁴⁵

When pigs eat swill they eat what people do not want to eat. And when they eat whey and skimmed milk they are not in direct competition with people either. But when pigs start to eat potatoes this is no longer the case. They are in metabolic competition with people. Note the dates: the citation above about the pigs of Lancashire and Cheshire is talking about the 1870s. There is no overall excess of potatoes at the time. The Irish Potato Famine between 1846-1850 killed a million people.

So at this point we learn something else that is indexed by the events on Burnside Farm. Even if – or maybe because – the methods of feeding that the Waughs used were anomalous, they are also interesting. Pigs may either eat food that people might also eat, or not. And the Burnside Farm pigs only ate leftovers. These may have been the leftovers of an economy of plenty. But even so, the Burnside pigs were not in direct metabolic competition with people.

Now let's move to meal. It has turned up twice in the story so far. One, the cottage pig was being fed with barley meal to fatten it up before slaughter. Two, the Waughs were asking Dring whether they should drive off-site to buy proprietary bagged meal for their condemned pigs. So does feeding pigs meal put the pigs into competition with people and what they eat? This depends on where the meal comes from. And most of it would have come from somewhere within the UK:

'Historically, the siting of the feed industry was close to the ports where the grain was offloaded, but in the second half of the 20th century, arable farming has increased and, since much of the wheat produced on arable

⁴³ Dring (2001, 3).

⁴⁴ Foot and Mouth Disease 2001: Lessons to be Learned Inquiry (2002, 49).

⁴⁵ Grigg (1989, 190).

farms is not suitable for flour milling, provides the raw materials for the industry. The suppliers of animal feed have moved geographically closer to their farming customers.⁴⁶

This is about all kinds of animal feed, not only pig feed. In 1939 three-quarters of the animal feedstuffs manufactured in the UK were made from materials that came from overseas⁴⁷. Now the proportion is much lower: about one-quarter. So there is less of the wider world on the British farm than there was. The most important reason for this is the startling increase in the productivity of UK arable farming⁴⁸. Just one example. A high energy, high fertiliser, high pesticide, high herbicide, genetically selected, high technology agricultural regime increased wheat production from 2.27 tonnes per acre in the period 1935-1939 to 7.09 tonnes per acre in 1990-3⁴⁹. Here, then, there is plenty of raw material for animal feedstuffs. When pigs eat this kind of meal, they do not directly compete with people either, for as we have just seen, the wheat produced on arable farms is not suitable for flour. On the other hand it does depend on a specific type of agriculture. An industrial agriculture. One that produces pollution as a side-effect.

The remaining one quarter of meal used for animals in Britain comes from raw materials grown overseas.⁵⁰ The networks involved stretch out to different distant places. The corn, for instance, comes from the US Mid West, the corn belt. And for soy there are three big exporters: the US, Brazil and Argentina:

'Between 1996 and 2004, soy output in Argentina rose from 11 million to 36.5 million tons, 95 percent of which was for export. This means soybean crops today cover fully half of the available arable land in the country ...

... as soy has expanded, the number of rural workers in Argentina has halved from one million to 500,000, and thousands of small landowners have been forced to sell up and join the ranks of the unemployed or precarious workers.

[GM] soy is a farm product that needs no farmers. In the northeast, far from the ports, the monoculture model demands extensive tracts of land and highly sophisticated machinery. To bring that about, land is being concentrated in fewer and fewer hands, and small-scale producers are disappearing.⁵¹

Competition indeed – and not only metabolic competition. To begin with, the soy that is shipped from Argentina to feed British pigs would have been perfectly suitable to feed the rural population of Argentina – or elsewhere. (While in 1925 five kilos of feed were need for each kilo of animal growth, with contemporary industrial efficiencies less than three kilos of feed are now required⁵². But this still means that the grain or the soy pigs eat in Britain is

⁴⁶ Baxter (1999, 21).

⁴⁷ Barfe(1997, 18).

⁴⁸ See Blaxter and Robertson(1995).

⁴⁹ Martin (2000, 1).

⁵⁰ Barfe (1997, 19).

⁵¹ Valente (2004). The quotation is from Chris Van Damme, Professor of environmental policy and sustainable development at the National University of Salta, in northwest Argentina.

⁵² Cunha (1977, 1-2).

not available to those who are short of food in the rest of the world⁵³.) But this is not the only problem. First, soy imports are a major source of genetically modified products within the UK, a matter of concern for some. And second, the very method of producing soy for export leads to unemployment. Many former small landowners and rural workers are thrown out of work, since few hands are needed to tend the hi-tech monocultures where soy is grown.

All of which puts pigswill in a different light. It may well be messy, and it certainly smells nasty. It may sometimes come with badly ordered paperwork. And the Waughs of Burnside Farm scarcely deserve a prize for excellence in farming. But feeding pigs with pigswill was also a way of making the great divide between rich and poor just a tiny bit smaller.⁵⁴ Feeding pigs with pigswill did not push people from rural Argentina from their land or their jobs. When pigs ate swill, they were not in direct metabolic competition with people. Drawing on an economy of plenty, this was a technique that fed some of the excess back into the metabolic circuits. The use of waste food does not require extra fertilisers, pesticides or herbicides either. Just a bit of extra energy to drive a lorry and, of course, to boil it.⁵⁵

Lesson three. Boiling pigswill is – was – a political technique for avoiding waste. It drew human food that was thrown out of it, back into human metabolic circuits. Thus it allowed pig-eaters in Britain (and Germany and wherever the exports went) to eat pig without increasing hunger elsewhere. Boiling pigswill was a political technique that, in a region of plenty, respected and helped to limit food scarcity on a world wide scale.

Conclusion

Boiling pigswill is an intriguing political technique. It is a stark example of how material politics may be done, of how politics may be done in a material way. For it helps to order the world, but this ‘order’ is complex. By patrolling the boundaries around ‘disease free’ countries and keeping foot and mouth virus out of them, until it was abolished, boiling pigswill helped to protect the rich from the poor. Globalisation may be about linking distant places, but it is not about making us all equal. Boiling pigswill also allowed the old tradition of metabolic intimacy between pigs and people to continue into modern times, by adapting this intimacy to farming on an industrial scale and to an England entangled in global trade. Now that pigswill has been banned, trading is still a long distance activity, and farming is still industrial. The tradition of feeding pigs on waste has finally disappeared, to the detriment of people in other places, far from England, who do not have enough to eat. What could have

⁵³ Epstein (1984, 159).

⁵⁴ The divide between countries with more or less food scarcity, again, does not neatly parallel that between countries in which foot and mouth is endemic, and those free of the disease. For recent updates on hunger see United Nations World Food Programme (2005)

⁵⁵ As we wrote this text, the Dutch television began to show a series of wonderful documentaries about pigs and their feed. The journalists bought two pigs and tracked down where the various foodstuffs they might feed them with come from. They wondered about the prohibition of feeding pigs with swill (found in the Netherlands as it is in Britain) and travelled to Argentina to film there how forest is right now being turned into large scale soy plantations. These programs, in Dutch (but try them anyway) are currently available as ‘oude afleveringen’ at: <http://www.rvu.nl/kvw/>

been their food is fed, instead, to pigs in England. Links between distant places allow food to travel against gradients of need. The fact we no longer boil pigswill, then, makes us yet more unequal, for the foot and mouth virus is still kept out of the rich world, but the excesses of its economy of plenty are no longer productively re-used.

This, then, is what we have learned about boiling pigswill as a political technique. That it did various things at the same time. That it ordered metabolic relations in a complex way, globally dividing the rich from the poor, linking up distant places and peoples, while simultaneously putting waste food to local use. But what, along the way, did we learn about material politics; on how to get a theoretical grasp on this? The answer, or so we would like to suggest, is that we have learned that material politics may be understood as a material ordering of the world in a way that contrasts with alternative and equally possible modes of ordering. And that, while material politics may well involve words, it is not discursive in kind.

Boiling pigswill did not take the form of an argument. The smelly task of carrying catering waste around and heating it for an hour no doubt involved talk, but it was not a politically contestatory discursive practice. In other locations there are plenty of arguments for and against long distance trade, for and against eating pigs, for and against being careful and economical with food. But boiling pigswill itself was not an argument in favour of anything much. And yet it practised a lot. By setting boundaries as well as making long-distant links it practised 'globalisation'. And it practised metabolic conservation, too. It did these things, intertwined together and in tension. Such practices deserve attention, for they help to make – or to unmake – the world.

If making and unmaking the world in one way rather than another is a political matter, then politics is done just as much in the practices that Arendt called 'labour' and 'work' as in those she designates as 'action'. Or perhaps more precisely, we need to say that if we look at the ordering effects of a practice such as boiling pigswill, it is not all that easy to differentiate between these three ways of being involved with the world. If one does not set off by separating mind from matter, attributing freedom to one and necessity to the other, but starts instead by studying practices, it is not obvious that such a separation makes sense.⁵⁶ If we meticulously describe the mundanities of a Burnside Farm, then all labour and all work appear to incorporate action. While all action, in its turn, is material and embodied: it depends upon and comes with work and labour.

Andrew Barry suggests that theorists would do well to restrict the use of the term 'politics' to sites and situations where issues are opened up for contestation. He suggests that if we do this it is easier to show the effort it takes to undermine the self-evidence of the configurations that we live with. The argument makes sense: it is indeed important to foreground the fact that political contestations involve work. They involve resisting the anti-political style that, to cite Barry, helps to 'close down the space of contestation'⁵⁷. But

⁵⁶ For the radical shift to a praxiographic approach, where 'practice' forms the entrance, see also Mol and Law (2004).

⁵⁷ Barry (2001, 94)

why should we, as analysts, restrict ourselves to showing such effort? Why not engage in it ourselves? The question, then, is not whether something is political, all by itself, but whether it can be called political as a part of analysing it. Whether it can be opened up for contestation in the process of writing about it.

In different contexts the effort of making things political takes different forms. Barry shows this beautifully in his study of various sites of embodied contestation. But what of the context of writing? How might writing be done in a way that opens up a space of contestation rather than closing it down? One way is to interview the ‘actors’ – in this case the Wauchs or others feeding their pigs with swill – and hope that that they will claim that however much their trade reinforced the boundaries between poor and rich people, they were simultaneously on the side of the angels in relation to the issue of how to share food well. We might find farmers making this claim. But if we didn’t we would not want to be stuck in our attempts to articulate the politics of boiling pigswill. So luckily there is an alternative strategy. What otherwise appears to be self-evident may be undermined through articulation⁵⁸. This is not simply a matter of adding words to silent practices. Articulation requires that practices are put into contrast with their others. If other, equally possible ways of ordering are presented along with those under study, this helps to open up a space of contestation.

While boiling pigswill itself is not discursive, the articulation of the material politics implied in it shifts things into a discursive realm. Thus articulation not only introduces contrast, but also involves transportation. The relevant translations⁵⁹ are complex since they imply the need to re-present a messy pig farm in the pages of a journal. A lot is lost along the way (you cannot smell our arguments). But we have gained something too: for it becomes possible to juxtapose what one may learn from investigating a single case with stories told elsewhere, by other scholars, NGOs, government agencies, industries, and so on, about other events and situations. A story about boiling pigswill may thus come to feed arguments.

But while articulation involves the introduction of contrast and thus contestation, presenting a theoretical analysis discursively is not the same as arguing for or against this practice or that. Drawing attention to contestation is neither an attack nor a defence. Look at this article. While we have called ‘boiling pigswill’ a political technique, we have refrained from unequivocally condemning or praising it. Instead we have tried to articulate how the specific material politics at stake here lead us off in different directions and create contrasts with different others.⁶⁰ Boiling pigswill indeed helped to divide the rich from the poor; to maintain an old tradition of metabolic intimacy in an era of global trade; but also, at the same time, to make the gap between rich and poor just a tiny bit smaller than it is now that swill is no longer fed to pigs.

⁵⁸ To articulate is to make connections and to join. It is also to give voice. In STS the term became important in Kuhn’s history of science, and then, more recently, in Haraway’s politics in which analysis and interference are drawn together. See Kuhn (1970) and Haraway (1991).

⁵⁹ Callon (1986)

⁶⁰ For an analysis of forms of co-existence among different orderings that may produce clashes without ‘debates’, see Mol (2002).

Finally, let us note that it was not primarily as a result of arguments that pigswill was banned. More important was the fact that the technique of boiling pigswill failed (as techniques often do). A failure on a single farm was enough to put an end to a long tradition. For when untreated swill was fed to a few hundred pigs, the boundaries between North and South, rich and poor, disease free countries and countries where foot and mouth is endemic, were all threatened with collapse. It was only at this point that a full blown debate emerged. In the arguments put forward in that debate what one might think of as metabolic economy did not count for much⁶¹. Restoring the boundaries was taken to be far more important than sharing food a bit more equally. Thus an old tradition was abruptly ended. Pigswill is no longer boiled in Britain.

References

- Arendt, H., 1958. *The Human Condition*. Chicago, The University of Chicago Press.
- Barfe, L., 1997. *Animal Feedstuffs: 1997 Market Report*. Hampton, Mddx., Key Note.
- Barry, A., 2001. *Political Machines: Governing a Technological Society*. London and New York, The Athlone Press.
- Baxter, J., 1999. *Animal Feedstuffs: 1999 Market Report*. Hampton, Mddx., Key Note.
- BBC, 2005. *The Best Meal You'll Never Have!*
http://www.bbc.co.uk/radio4/science/costingtheearth_20050414.shtml, last accessed 9th June 2005.
- Blaxter, K., Robertson, N., 1995. *From Dearth to Plenty: the Modern Revolution in Food Production*. Cambridge, Cambridge University Press.
- Callon, M., 1986. Some Elements of a Sociology of Translation: Domestication of the Scallops and the Fishermen of Saint Brieuc Bay, in Power, Action and Belief: a new Sociology of Knowledge? Sociological Review Monograph. J. Law, Ed. Vol. 32. London, Routledge and Kegan Paul.
- Cunha, T.J., 1977. *Swine Feeding and Nutrition*. New York, San Francisco, London, Academic Press.
- Department for Environment Food and Rural Affairs, 2002. Origin of the UK Foot and Mouth Disease Epidemic in 2001.
<http://www.defra.gov.uk/corporate/inquiries/lessons/fmdorigins.pdf>; updated June 2002, last accessed 29th August, 2003.
- , 2004. Risk Assessment for the Illegal Import of Contaminated Meat and Meat Products into Great Britain and the Subsequent Exposure of GB Livestock (IIRA). <http://www.defra.gov.uk/animalh/illegal/pdf/risk-assessment04.pdf>, last accessed 23rd December 2005.

⁶¹ The only argument we have found comes much later from the pen of the maverick Conservative MP, Boris Johnson, and he is more concerned with global inequalities than he is in the state of the sewers and the economic predicament of those who fed waste to their pigs. Even so, he seems to be a lone voice. See Johnson (2004).

- Dring, J., 2001. My Involvement with the Wauchs.
<http://www.defra.gov.uk/footandmouth/pdf/dringsstatement.pdf>; updated 16th March 2004, last accessed 9th August 2004.
- Epstein, H., Bichard, M., 1984. Pig, in The Beginnings of Animal Domestication. I.L. Mason, Ed. London and New York, Longman.
- Food and Agriculture Organization, 2004. FAOSTAT.
<http://apps.fao.org/default.jsp>, last accessed 9th August 2004.
- Foot and Mouth Disease 2001: Lessons to be Learned Inquiry, 2002. Report.
<http://213.121.214.218/fmd/report/index.htm>, last accessed 28th August, 2003.
- Foucault, M., 1979. Discipline and Punish: the Birth of the Prison. Harmondsworth, Penguin.
- Franklin, S., Lury, C., Stacey, J., 2000. Global Nature, Global Culture. London, Thousand Oaks, New Delhi, Sage.
- Grigg, D.B., 1989. English Agriculture: an Historical Perspective. Oxford and New York, Blackwell.
- Haraway, D., 1991. A Cyborg Manifesto: Science, Technology and Socialist Feminism in the Late Twentieth Century, in Simians, Cyborgs and Women: the Reinvention of Nature. D. Haraway, Ed. London, Free Association Books.
- House of Commons Select Committee on Environment Food and Rural Affairs, 2001. Minutes of Evidence: Examination of Witnesses (Questions 20 - 39), Wednesday 31 October, 2001. London, The Stationery Office.
- Johnson, B., 2004. Let Them Eat Pigs - They Love It. The Daily Telegraph. 22 January 2004.
<http://www.telegraph.co.uk/opinion/main.jhtml?xml=/opinion/2004/01/22/do2202.xml>, last accessed 13th June 2006.
- Kuhn, T.S., 1970. The Structure of Scientific Revolutions. Chicago, Chicago University Press.
- Latour, B., 1998. Pandora's Hope: Essays on the Reality of Science Studies. Cambridge, Mass., Harvard University Press.
- Law, J. 2006. Disaster in Agriculture, or Foot and Mouth Mobilities. Environment and Planning A. 38, 227-39.
- Liu, M., Boireau, P. 2002. Trichinellosis in China: Epidemiology and Control. Trends in Parasitology. 18 (12), 553-56.
- Malcolmson, R., Mastoris, S., 1999. The English Pig: A History. London and Rio Grande, The Hambledon Press.
- Martin, J., 2000. The Development of Modern Agriculture: British Farming Since 1931. Basingstoke, Macmillan Press Ltd.
- Massey, D., 1999. Power-Geometries and the Politics of Space-Time. Heidelberg, Department of Geography, University of Heidelberg.
- Mol, A., 2002. The Body Multiple: Ontology in Medical Practice. Durham, N. Ca., and London, Duke University Press.

- Mol, A., Law, J. 2004. Embodied Action, Enacted Bodies. The Example of Hypoglycaemia. *The Body and Society*. 10 (2-3), 43-62.
- Organisation Internationale des Épizooties, 2004. Countries Recognised by the OIE as Free from Foot and Mouth Disease without Vaccination.
http://www.oie.int/Cartes/world/a_Monde.htm; updated 3 June 2004, last accessed 21 Jan 2005.
- Rimmer, H., 2003. Down the hatch: Organisations divided over the effectiveness of food banks. *The Guardian*. 9th July 2003.
<http://society.guardian.co.uk/societyguardian/story/0,7843,993963,00.html>, last accessed 23rd September 2004.
- Statutory Instruments 1999 No. 646, 1999. The Animal Byproducts Order.
<http://www.legislation.hmso.gov.uk/si/si1999/99064604.htm>; updated 8th March 1999, last accessed 1st September 2004.
- The Royal Society, 2002. Infectious diseases in livestock. Scientific questions relating to the transmission, prevention and control of epidemic outbreaks of infectious disease in livestock in Great Britain.
<http://www.royalsoc.ac.uk/inquiry/>, last accessed 29th August, 2003.
- Thompson, F., 1973. *Lark Rise to Candleford*. Harmondsworth, Penguin.
- United Nations World Food Programme, 2005. World Food Programme Home Page. <http://www.wfp.org/index.htm>, last accessed 2nd March, 2005.
- Valente, M., 2004. Soy Overruns Everything in its Path.
<http://www.ipsnews.net/interna.asp?idnews=24977>; updated 6th August 2004, last accessed 20th September 2004.
- Wiseman, J., 2000. *The Pig: a British History*. London, Duckworth.
- Woods, A., 2004. *A Manufactured Plague: the History of Foot and Mouth Disease in Britain*. London, Earthscan.