



‘CARNAGE BY COMPUTER’: THE BLACKBOARD ECONOMICS OF THE 2001 FOOT AND MOUTH EPIDEMIC

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Introduction

In a series of papers of which this is the first, we intend to draw conclusions for regulatory theory and policy from the catastrophic epidemic of foot and mouth disease (FMD) in the UK in 2001. Our work makes repeated reference to the various local, national and EU official inquiries into the epidemic, including the three specially commissioned by central government: *The Future of Farming and Food*, chaired by Sir Don Curry (Curry, 2002); *Infectious Diseases in Livestock*, chaired by Sir Brian Follett (Royal Society, 2002; hereinafter IDL); and *Lessons to be Learned*, chaired by Dr Iain Anderson (Anderson, 2002; hereinafter LTBL). However, we intend our work to be a direct challenge to the most important of those inquiries, LTBL, for the principal lesson to be learned is sadly missing from the report of this inquiry and all other official analyses of the epidemic: that epidemic was not merely badly managed by the government but was *caused* by the government’s agricultural policies. The 2001 FMD epidemic is an appalling regulatory failure which, despite the relative simplicity of the issues in terms of policy formulation, the government still shows little or no sign of being able to address adequately.

Our argument can be outlined briefly: though the agent responsible for FMD is the FMD virus, the UK FMD epidemic of 2001 was caused by the agricultural

policies formulated by the elite of British stock rearers and dealers, organised around the National Farmers' Union (NFU), and a public body, the Ministry of Agriculture, Fisheries and Food (MAFF), which had been captured by that elite. In essence, though no compelling reason has been officially advanced why FMD should not now be treated as a normal business risk, control of FMD has been unthinkingly treated as a problem requiring state intervention, and livestock rearers have therefore largely been relieved of the direct expense of disease control, which is regarded as a public good. The result of that intervention has been arguably the largest epidemic of FMD ever recorded anywhere in the world (Clover and Beswick, 2001), certainly the epidemic in which most animals were killed,¹ which has caused an economic loss which the Department of the Environment, Food and Rural Affairs (DEFRA) estimates to be £9 billion (DEFRA/DCMS, 2002).² This figure is but a remote expression of the concrete losses, which include: the premature deaths of over ten million animals (Robertson, 2002; Uhlig, 2002a), killed in ways which were almost always unacceptably, indeed criminally, inhumane and very often so horribly cruel as to be an occasion of lasting national shame; the loss of irreplaceable special breeds; the horror experienced by those with a scrap of humanity involved in the cull; the misery of thousands of small farmers and small businesspersons in areas related to farming and tourism whose incomes were drastically reduced, some of whom were driven into bankruptcy; the (continuing) pollution caused by the disposal; the frustration of the enjoyment of the countryside for a year; and a despicable display of criminal and *ultra vires* (if unpunished) authoritarianism by MAFF, which had to persistently exceed its powers, breach its own regulations, and use intimidation and force to implement a policy so lacking in merit that it could not have been implemented by rational persuasion. The FMD crisis is, in sum, an object lesson in how not to regulate. There are so many of

these lessons readily to hand that the point in drawing attention to this one is the almost incredible enormity of what was done, for that a policy can be implemented despite having costs on this scale should really deepen even further our awareness of the extent of 'government failure'.

The most difficult question now is not what to do about FMD but how to explain that such a disastrous policy towards it could have been adopted and maintained. Our answer involves three specific claims: first, it was the livestock rearing practices devised by NFU and MAFF under the Common Agricultural Policy (CAP) which created the conditions in which an initial outbreak of FMD in British livestock (which was inevitable) could become epidemic; second, the regulatory response to that initial outbreak was hopelessly inadequate to the magnitude of the risk and could not stop the outbreak becoming epidemic; and third, it was because these agricultural policies were devised in what we are obliged to call an environment of almost total lawlessness that they could take these catastrophic forms. It is not possible to make all of these claims convincingly within the confines of a single paper. In this first paper we will focus on the second claim, the substance of which has more or less entirely preoccupied public debate and which therefore seems the most appropriate place to start, if only to show how essential it is to expand the parameters of that debate.

We will very briefly describe the epidemiology of FMD and the character of the disease control policy taken towards it, and then show how this policy was manifestly inadequate to control what became an epidemic. When this paper was first drafted, it was an attempt to show just how abysmal MAFF's performance during the epidemic had been, for the government was then strenuously denying it (UK Government, 2002).³ This is now otiose, at least in a theoretical paper. For, in the

light of the overwhelming evidence, there is wide agreement, to which LTBL and even, to a limited extent, DEFRA itself subscribes, that MAFF's performance was abysmal; and, in light of this, LTBL is but one of large number of influential calls for the government to prepare better contingency plans. With hindsight, many extra provisions for dealing with another outbreak have been proposed: greater numbers of vets to identify the disease; more officials to enforce precautionary measures, particularly the inspection of overseas meat imports; bigger rendering plants; greater vaccine stocks; and so on (DEFRA, 2002a; 2002b). But the costs of controlling a future outbreak in this way will be enormous, indeed they appear quite fanciful, and they do not address the root of the matter. If questioned prior to the epidemic, MAFF would certainly have said it had adequate contingency plans in place; and indeed, as we will see, one of the reasons the outbreak became an epidemic was that during its initial stages MAFF wrongly insisted that it was under control. We will argue that the inadequacy of the contingency plans and the misplaced faith in them is a stark example of what Coase calls 'blackboard economics': policies that work superbly, or even perfectly, on the blackboard, but which are seen to be weak or even risible when the costs of actually implementing them are properly evaluated. The effort now is to improve public disease control, but whether disease control is properly regarded as a public good has not even been asked in any official discussion of which we are aware. The maintenance of the assumption that disease control is a public good, itself based in an unquestioned belief that state intervention is the best way to deal with the problem of disease, involves the most blinkered blackboard economics.

That the government can simply persist in its failed policies in this way even after MAFF's performance in 2001 is perhaps the worst aspect of the entire episode, other than the appalling cruelty. The government has accepted criticism only with

reluctance, LTBL and the other two inquiries being of an unclear public status, commissioned as an alternative to an overall public inquiry which would have had to put on public record MAFF's widespread illegal actions. The government's main response to the epidemic to date has been to legislate (Animal Health Act 2002) to place on a legal basis the illegal contiguous cull which it nevertheless carried out during the 2001 epidemic, and to change the name of MAFF to DEFRA. This is not enough; indeed, it is a disgraceful adherence to failed policies, and we will return to this. In our view, unless there is radical change, a further epidemic is inevitable.

Two points about the epidemiology of FMD

FMD is an epidemic, viral infection to which all cloven-footed animals, including those most commonly domesticated for agriculture, are susceptible (IDL). It has been known for at least four centuries everywhere in the world where livestock are reared. In 1897 the agent responsible for it was identified as the FMD virus, one of two members of the aphthovirus genus within the family *Picornaviridae*. For the purposes of adopting a regulatory policy towards FMD, two points must be stressed about the epidemiology of FMD: it is an extremely contagious disease but also one which is very rarely fatal.

FMD is able to be transmitted by direct contact with infected, carrier animals, by contact with their discharges, by being physically carried on other creatures which cannot actually contract the disease and on inanimate objects such as farm vehicles, and by air over short and long distance. The incidence of long distance transmission by air is highly dependent on environmental factors and on the nature of the specific strain of FMD virus involved.⁴ Far more important, however, is short-range transmission by any of these means between animals brought into proximity or

contact. Some infected animals can remain carriers over their productive lifetimes. FMD virus can survive for weeks in faeces and urine and up to 6 months in animal slurry. Infected animals, especially pigs, exhale large amounts of the virus and this probably is the major source of transmission. In sum, FMD is an extremely contagious disease; as MAFF (2001) had it: ‘probably more infectious than any other disease infecting animals’.

FMD takes its name from some unpleasant symptoms infected animals may display, of the growth of vesicles or blisters chiefly in and around the mouth and feet which are a source of considerable discomfort and which make chewing and walking painful, sometimes to such an extent that the animal becomes effectively lame. However, the principal symptom of FMD is fever. An infected animal is very likely to show symptoms, but the severity of those symptoms differs widely between different animals. It may easily pass entirely unnoticed in herds of sheep until they go lame (if they do), and even then be hard to detect in the context of normal husbandry practices. It is, however, also a low mortality disease, for almost all adult cattle and sheep and over 90% of adult pigs will recover within two weeks. On the other hand, weak or young animals may die, and in particular mortality among newly born animals may be high as it induces myocarditis (heart disease). Adult cattle which recover may display ‘reduced performance’ in that their ability to gain weight and produce milk may be impaired.⁵ However, the point which must be stressed here is that adult animals very rarely die of FMD. If they show clinical signs, they are almost always poorly but recover within two weeks after what in the literature is often compared to a bout of the flu (Houghton Brown, 2001).⁶

It is a very important related point that although human beings (and other animals which cannot actually contract the disease) can be short-term transmitters of

FMD virus, which can reside in the nose and on clothing for up to 2 days, they cannot contract the disease even by handling infected animals, and certainly not by eating food products obtained from infected or vaccinated livestock. The Food Standards Agency (FSA) has said that FMD has ‘no implications for the human food chain’ (FSA, 2001).

The control of FMD

FMD virus is at home everywhere where livestock is reared at all intensively. It remains epidemic in some tropical and sub-tropical areas of South America, Africa and Central Asia, and is sporadically epidemic throughout the remainder of the tropics and the sub-tropics (OIE, 2002). (It is very likely that the 2001 epidemic represented the most westward outbreak of a pandemic spread of a strain of the virus which originated in India in 1990 (IDL: para 4.4 and LTBL: para 7.2)). Prior to the recent epidemic, FMD was not confined (if this is the right word) to these tropical and sub-tropical areas because the virus is particularly suited to these conditions; indeed it prefers moderate temperatures and moist conditions. Rather, FMD virus has had to be actively eliminated from other areas, which demands resources not generally available in typically poor tropical and sub-tropical countries.

In western Europe, a very vigorous policy of ‘stamping out’ the virus by slaughter of all infected and seriously at-risk animals and compulsory, mass, prophylactic vaccination has been pursued since the second world war, leading to the position where there were no recorded outbreaks in Europe in 1990. Until the recent epidemic, the EU had claimed FMD free status since 1991. In the UK prior to 1990, there had been on average one outbreak per year, with that of 1967 being the only post-war outbreak of major size. Stamping out alone led to FMD free status in the

UK, where prophylactic vaccination has never been practised. Vaccination of cattle against FMD within the EU, and most of continental Europe, was ended in 1990-1991, and prophylactic vaccination has been made illegal (though emergency 'ring' vaccination, probably in advance of slaughter, as a response to an outbreak may be permitted (European Commission, 2001)). A number of relatively small outbreaks occurred throughout Europe in the 1990s, and these were stamped out by slaughter without general reintroduction of vaccination.

Although the European decision to cease prophylactic vaccination and the phasing out of veterinary frontier controls with the creation of the single market in 1993 left an enormous population of livestock fully susceptible to FMD, it was by no means necessarily an irrational decision.⁷ As the disease can be windborne from outside the EU; as wild, cloven-footed animals such as deer will not be vaccinated; as the disease can be present in imported animal feed (and other meats); and as a vaccine that will completely eliminate the virus is not available, vaccination would have to be a continual process (and would have to be allied with other biosecurity measures) carried out against the sporadically endemic persistence of the disease. Such vaccination is, of course, costly, and imposes further expenditure on continuous vaccine development as the FMD virus evolves to combat current vaccines. However, prophylactic vaccination cannot simply be ruled out as the annual cost of routine vaccination in the UK has been estimated at what seems to the relatively small sum of less than £150 million (IDL: fig 8.2).⁸

The identification of FMD

An adequate regulatory policy towards FMD must have at its heart a recognition of the two aspects of the disease we have noted: that it is highly contagious but

occasions only low rates of mortality (Power and Harris, 1973: 573). In essence, the basic problem is that infected animals live to transmit the disease, and this is a crucial component of its extreme contagiousness (IDL: para 3.16). In view of this, it is very important to any policy which intends to seek to keep FMD to an absolute minimum to minimise the risk of an outbreak. But as FMD is so contagious that an outbreak of some size is inevitable, it is absolutely crucial to a policy of control by stamping out that such an outbreak is, as the relevant EU regulation has it, ‘immediately’ identified, so that animal movements can be curtailed and the source of disease isolated, and that infected and at risk animals be disposed of ‘immediately’ (*ibid*: para 4.12). The following account of the outbreak demonstrates that the regulatory measures adopted failed hopelessly to do either of these things in anything like a timely fashion, much less immediately; indeed, as we shall see, in a most important way the disease was never properly identified at all. Biosecurity failed because the regulatory structures failed to provide any effective deterrent against conduct likely to generate the risk of FMD. In particular,⁹ the extent of animal movements in the UK livestock industry was not understood by MAFF. In such circumstances, the large-scale tagging and tracing of animals proved of little utility (Bourbakis and Allinson, 2001-2). Moreover, the initial optimism of MAFF that the sources of the disease could be traced, based on its ignorance of the magnitude of the risk, greatly hindered the effective handling of the outbreak.

It is now claimed that an outbreak in February 2001 in a pig rearing unit in Heddon-on-the-Wall, Northumbria, operated by one Bobby Waugh and his brother, was the source of epidemic (LTBL and IDL). Conditions on this intensive fattening unit would be found disgusting by any reasonable person who had them brought to her or his attention and Waugh’s animal husbandry left something to be desired even

by industry standards (e.g. numerous pig carcasses submerged in animal faeces were found during the official clean-up (Wainwright, 2002)). Waugh has been convicted *inter alia* of animal welfare offences and he is now banned from owning or dealing in animals for 15 years. But even now it is by no means certain that Waugh's unit was the source, and certainly striking curiosities remain of which we will mention but one. In an outbreak of FMD in France in March 2001, 31 sheep were tested. 21 of those sheep proved negative, but ten proved positive, with seven testing highly positive.¹⁰ These sheep were transported to France from Wales before the end of January, which would certainly seem to raise doubts as to the date and location of the outbreak (in February, in pigs, in Northumberland) accepted in the published reports. The MAFF explanation, endorsed by LTBL, is that the French testing probably represented 'false positives' (IDL: 52). This would be an astonishing coincidence.

If we accept that Waugh's rearing unit was the source of the outbreak, then it would be natural to conclude that a simple regulatory step may have prevented that outbreak. The most likely explanation for the transmission of FMD to the pigs would have been the use of unprocessed pigswill probably containing meat illegally imported from Asia. There is speculation as to how such meat would have made its way into pigswill, and suggested sources are Chinese restaurants in the Newcastle area or army camps in the locality. Yet only just over 1% of pig farmers use pigswill, and the saving over other sources of swill is minimal – about £5 over the lifetime of a pig (Brown, 2001). The simple solution adopted by DEFRA as an interim measure was to ban the practice of feeding swill to pigs in the UK. Highly questionably, this ban has yet to be confirmed as a permanent measure, even though the EU may be moving in this direction (DEFRA, 2001).

The use of swill continues under a regulatory regime which purports to ensure that it is safe by ordering that it be adequately processed, providing criminal sanctions against failure to do so. As it operates, this regime is preposterous. Early in 2001, in the North East of England, in Crook, a dealer in pigswill, Andrew Clement, was found to be passing unprocessed swill to farms. In a breathtaking example of the potential shortcomings of criminal law based regulation, given the eventual costs of the FMD outbreak, Clement was fined £400 by magistrates (Elliot and Webster, 2001). In respect of the very serious matter of the illegal importation of meat, the costs of inspection of imported meat by port health authorities, passed on to the importer, are £30 per tonne, so that a 40 foot-long container with 30 tonnes might cost £2,800 to inspect. In contrast, the maximum fine before the Magistrates' Court is £5,000 (The Product of Animal Origin (Import and Export) Regulations 1996, S.I. 1996/3124). The *very first* conviction for illegal meat importation (39 kilos of illegal bushmeat) obtained by a local Port Health Authority took place only in July 2002, and the fine imposed was £150 (Harris and Browne, 2001). There would seem to be incentives rather than disincentives to shippers to evade inspection and engage in illegal importation. Wider powers were given to prohibit the movements of meat imports at the time of the FMD outbreak (The Products of Animals (Import and Export) (Amendment) (England) Regulations 2001, SI 2001/1640), and responsibility for meat inspection is to pass from Port Health Authorities to Customs and Excise.

First suspicions of the disease arose not in Northumberland but following a veterinary inspection of pigs at the Cheale Meats Abattoir at Brentwood, Essex on 19 February 2001. Although the disease was confirmed the following day, a five-mile exclusion zone (the stipulated response) around the Essex abattoir was not put into place until two days after the inspection (Studd, 2001). The tracing of the animals

passing through the abattoir suggested that Waugh's unit was the source of infection. A five-mile exclusion zone was established around Waugh's unit on 23 February 2001. However, it is also known that sheep sent to Hexham Market on 13 February were infected. There were 3,800 sheep passing through Hexham Market on that day and 120 dealers attending the market (HM Comptroller and Auditor General, 2002: para 1.7; Elliott 2001; Cumbria Foot and Mouth Disease Inquiry Panel, 2002: 25). It follows that the way MAFF established exclusion zones was impossibly dilatory given that over 24,000 thousand potentially infected animals were being dispersed widely across the country whilst it was doing so (LTBL: 51)!

Indeed, there may well have been in excess of 100 sites of infection by the time of the first confirmation of the disease in Essex.¹¹ Stamp out depends upon an ability to trace animals as they move around the country so that MAFF can know where the stamping out has to take place, and possession of a robust animal movement (ANIMO) system is central to the EU's FMD policy. The tagging of animals for the purpose of ensuring they have been subject to the specified biosecurity procedures and for tracing them in the event of an outbreak of disease is the cornerstone of the UK disease control policy. However, the huge investment in tagging and record keeping makes sense only if the scale of animal movements is such that it is feasible to trace a limited number of contacts in order to ring fence infected farms. Modern livestock rearing practices within the UK, much less the EU as whole under the single market, make this most unlikely, and certainly the 'Disease Control System' used in the UK displayed drastic failures: so slovenly had been the data processing that in July 2001, towards the end of the crisis, there were still over 800 infected premises which the control system recorded as having zero animals (HM Comptroller and Auditor General, 2002: 78)!

The basic problem is that there was a tremendous disparity between the capacity of the control system and the actual volume of livestock movement. To take only the UK: in essence, modern livestock rearing is a system to which long distance live animal movement is absolutely central, and there can be no doubt whatsoever that the basic reason the outbreak became an epidemic was the background number of live animal movements which takes place. In 2001, infected animals were shipped the length of the country and brought into contact with animals from most other parts of the country, before themselves being moved on (LTBL: para 8.2). A policy which was intended to spread the disease would not be much different. It is a shameful lacuna in all official discussions of this matter that this central point, blatant though it remains, is downplayed to a very great extent. There are, so far as we know, no accurate estimates of total animal movements in the UK, and that none of the three principal inquiries has attempted to remedy this is itself a problem calling for social scientific explanation.

We will mention only three points about this. First: in 1970 there were 2,000 abattoirs in the UK (IDL: para 5.44); in 1991 there were only around 1,000. In the 1990s, whilst EU policy created a huge at risk livestock population, more than two thirds of these abattoirs were closed (Shaoul 1997; Kennard and Young, 1999). The resulting increase in the volume of animal movements within the UK has not, to our knowledge, been precisely quantified (a fact itself damning of MAFF), but it must be enormous. The BSE inquiry found that in 1994, as a result of abattoir closures, 20% of cattle travelled very long distances to slaughter, literally including movement from northern Scotland to the south east of England (Phillips, 2000: vol.12, para 4.14) Some abattoir closures resulted from the imposition of new EU standards (Shaoul, 1997) . However, alongside this were significant changes in food production and

consumption. More than 80% of the meat for human consumption is now handled through a major supermarket chain (David Taylor M.P. (H.C. Deb. 374, col.111, 6 November 2001). The desire of many such retailers to produce meat presented to the consumer uniformly dressed and packaged means the concentration of meat production in certain chosen abattoirs. Many objections have been raised to this in terms of the destruction of local and small-scale food production and the degradation of food quality (Hines, 2000). The point we wish to stress, however, is that it has been done without any consideration, so far as we are aware, of the stress it placed on the FMD biosecurity regime.

Second: there are an enormous number of live animal movements within the EU and specifically between the UK and the rest of the EU (Lucas, 2001). Some 600,000 to 800,000 lambs are, for example, exported from the UK annually (Bennett, 2000: fig 4.4). Given all that we know of the epidemiology of FMD, this is an extremely hazardous practice, and again there seems to be no analysis of the stress it places on the FMD biosecurity regime. Farmers selling live lambs abroad gain a premium of about £3 per head before the extra costs of transport and in 2000 the business as a whole generated gross receipts of £31 million. We have been unable to identify any attempt to relate this to the costs of the stress these sales place on the FMD biosecurity regime.

Third: there is what appears to be a huge but of its nature unknown and unknowable dimension to animal movements created by CAP subsidy. Not long after the FMD outbreak, MAFF introduced a 21-day restriction on stock movements after initial shipment. Explaining the need to introduce this measure, that stock figure of the modern promulgation of regulatory initiatives, an unidentified 'Cabinet Minister', was quoted as saying:

Nobody took account of the extent to which dodgy farmers moved sheep around to claim quota payments. That is the true story (Prescott and Leake, 2001).

This is a reference to the practice of 'bed and breakfasting' farm animals so that the numbers of animals forecast for the farm, early in the season, are actually available to the farmer at the time of inspection, thereby avoiding any shortfall in quota payments (Committee of Church and Nation, 2001). The 'Cabinet Minister' is alleging that farmers who have a shortfall in forecasted numbers when the census for the purposes of the calculation of quota payments is taken borrow animals in order to ensure a higher quota payment. There are other variants of illegal movement which turn on the workings of CAP which are too arcane to spell out here. One point will suffice: in 2001 the disease was spread to Scotland, Northern Ireland and the Republic of Ireland by a single dealer looking to gain a £10 per head premium plus a 4.5% VAT rebate by illegally passing off English lamb bought at Carlisle market as Irish lamb (Sheenan and Kearney 2001; Cowan, 2001). After the onset of FMD, cattle and sheep movements were tightly controlled. However, even after these controls were imposed, there were still over 700 investigations into illegal movements, leading to 195 cautions and 30 prosecutions most of which seem to have led to conviction (LTBL: para 3.58).

The most generous view of the quality of the information available to MAFF now accepts that MAFF estimated transshipments of animals at only half of the rate of actual movements. For present purposes this generous view is not worth disputing as it itself represents a complete failure by MAFF to understand the size of the risk it was attempting to regulate. And the failure was compounded by the consequent extremely misplaced initial confidence of MAFF that it could control the spread of

disease. By the end of the first week in March the Chief Veterinary Officer issued the following statement:

Most of the animals if they are going to develop the disease...should be showing signs last week and this week and possibly some overflow into next week. So the first evidence is that because we stopped all movements, we stop the spread of disease (Henderson, 2001).

This can be placed alongside the similarly optimistic view expressed on the same day by the Director of the Institute of Animal Health, whose laboratory was central to the response to the outbreak:

My understanding is that the vast majority, if not all the current cases, are on farms with a link to the original outbreak and that is good news...everything that has happened so far might have been predicted. Had the disease taken off and moved out of control we would have expected to see cases with no connection to the original source by now (Henderson (2001)).

Perhaps most embarrassingly, a few days after the discovery of the disease at the Cheale abattoir, the recently established FSA issued a press release congratulating itself on the 'vigilance' which allowed it to make that discovery, clear evidence of its having successfully carried out one of its 'key roles [of ensuring] that no unfit animal enters the abattoir' (Food Standards Agency, 2002). All this optimism was hopelessly misconceived. As the disease did not peak until the end of the first week of April, and then only after the introduction of the horrendous contiguous cull policy (discussed below), the statement by the Chief Veterinary Officer would have been true only if issued a whole month later.

Statements such as these produced the impression that MAFF was in control of the outbreak and in the process of eliminating it. LTBL (para 9.1) states that other 'government departments were not greatly involved at this stage, largely because MAFF was not asking for help'. LTBL suggests that the complacency within MAFF about disease control affected the entire Department:

Individual groups and managers not directly involved with the outbreak remained focused on their own targets. There was no incentive to release staff to help in the fight against FMD (*ibid*: para 9.2).

On 11 March, Nick Brown, then the Secretary of State for Agriculture, appeared on 'Breakfast with Frost' (LTBL: annex E). He stated that the disease was under control and, when pressed, repeated that he was 'absolutely certain' about this. As LTBL points out, there was no evidence on which to base this view: 34 cases of FMD had been notified in the two days prior to Mr Brown's statement, 164 cases had been confirmed in total, and in Cumbria alone there were over 40,000 carcasses awaiting disposal. In the words of one farmer giving evidence to LTBL:

We felt absolutely insulted and patronised by these lies that we were told (LTBL: 81).

What is certain is that these continuing assurances from MAFF delayed the eventual stopping of the disease. The Cabinet Office Briefing Room (COBR)¹² - the *ad hoc* committee which is convened to deal with national emergencies such as the possible terrorist threat immediately after 11 September 2001 - was eventually put in control of work across all departments handling the epidemic, but not for almost two weeks after Mr Brown's statement on television. As we shall see, COBR's cross-departmental powers allowed it to organise a cull on such a gigantic scale that the disease was stopped, but that it had to be involved at all is a sure sign that MAFF had lost control. COBR meets in a reinforced subterranean bunker in which televisions monitor sensitive areas of London. The incredible state of affairs in which a regulatory problem of livestock rearing and farm economics could be dealt with only by a government apparatus designed to deal with problems more akin to general insurrection has passed with little other than approving comment in the official reports (e.g. LTBL: ch. 11).

An interim conclusion

There is much more we could add but this is enough for the purposes of this paper.

The conclusion which must be drawn is this: the ‘game’ of control of the 2001 FMD outbreak was lost before the MAFF heard the starting whistle. MAFF’s contingency planning was hopelessly inadequate for it had no idea of the risk that UK livestock rearing practices, especially the volume of animal movements, posed. The main point we wish to stress in this paper is that MAFF’s having a disease control system in place when it had no idea of the magnitude of the risk that the system was meant to control makes that entire system absurd. This is exactly what was exposed by the FMD epidemic. The absurdity is compounded when, as was the case in this instance, the risk was produced by livestock rearing methods which were entirely subject to safety regulation by MAFF. This has not prevented Mrs Margaret Beckett, now Secretary of State for Environment, Food and Rural Affairs, in her Parliamentary response to LTBL, pleading that the epidemic was unforeseeable, being due to ‘a rare set of circumstances’ – and that this largely excuses those failures which DEFRA now does acknowledge (Secretary of State for Environment, Food and Rural Affairs, 2002).¹³ For DEFRA and the various official reports to say, as they essentially do, that no contingency planning could have foreseen this unprecedented risk is simply a disgrace. The National Audit Office’s (NAO) report, for example, unambiguously concludes that MAFF’s contingency plans were insufficient to deal with the outbreak(s) that led to the epidemic. However, NAO also concludes that no contingency plan could have coped with this outbreak, which was of an ‘unprecedented’ size, and the NAO agrees with MAFF’s view that this mitigates MAFF’s failure (HM Comptroller and Auditor General, 2002: 4).

In this way, official discourse even after the epidemic fails to make the crucial link between MAFF's failure to be aware of the size of the risk posed by the livestock industry which it regulated and the undermining of the disease control system it designed and implemented, and, in effect, uses the absence of that link as an excuse. But if a private business stored such a large quantity of flammable materials on its premises that its fire control measures could not cope with the great size of a fire caused thereby, would it be excused from liability for the damage caused, even if it honestly pleaded in its *defence* that it hadn't kept an accurate estimate of the risk because it had no idea what quantity of materials were stored? In the simply bewildering world of official discourse about FMD, obvious questions seem not to be able to be asked and obvious responsibilities seem not to be able to be sheeted home.

Before drawing more general regulatory conclusions from this, we turn now to how MAFF dealt with a situation which, from the outset, was beyond its rational control by compounding the irrationality.

From cull to massacre

The stamp out policy requires the ring fencing and isolation of sites of disease. MAFF's contingency plan envisaged up to fifteen sites of infection lying undetected prior to the first notification. The policy depended on the rapid closure of all activity around these sites and the culling of the animals to prevent transmission of FMD. The large number of infected sites across a wide geographical area ought to have caused an early and critical review of this policy. For example, William Cleave of Devon, now thought to be the first person to be affected through dealings at the Hexham Market, was one of the largest operators in the County, working from thirteen different sites (Gillan, 2001). It seems to be accepted that the transshipment of his

animals was the sole source of introduction of the disease into the region, but Devon eventually suffered 173 confirmed cases of FMD. The rapidity of the spread of FMD across a wide geographical area could have prompted early consideration of other possible disease controls such as vaccination (probably followed by slaughter). However, the contingency planning had made no provision for this. In the words of the Chief Veterinary Officer:

No estimate (had) been made of the human resource requirements for a vaccination programme...The assumption (was) made that a stamping out policy would be operated first and that, if sufficient trained resources were immediately available as outlined, vaccination could be avoided (LTBL: 124).

European Union Guidelines on contingency planning demanded that Member States provided resources for the immediate availability of trained staff to cope with up to ten cases at any one time and to maintain surveillance within a three kilometre protection zone of each case (European Commission, 1991). The FMD outbreak of 2001 was to generate demands for resources considerably in excess of such a contingency plan. There simply were not remotely enough vets (or other MAFF or other agency personnel) to hand: MAFF 'simply ran out of vets', as the Public Accounts Committee had it (Uhlig, 2002d). By way of illustration of the magnitude of the shortfall, LTBL states that around 80% of the vets in the State Veterinary Service (SVS) were needed to tackle the swine fever outbreak of 2000, even though that was confined to just 16 cases (LTBL: para 9.2).

The Devon Inquiry reports that the SVS had been 'run down over the last two decades and was greatly over-stretched during the outbreak and its aftermath' (Mercer, 2002). Simply making more funds available could not really remedy the problem which had been created; adequately trained and experienced personnel just were not available. When it became clear that the SVS could not cope, additional vets,

including vets from abroad or trainees, were recruited to assist. Perhaps most of these personnel would not have been regarded as good enough in any other than emergency circumstances; they certainly had but a very limited knowledge and experience of FMD. However, the goodwill of the vets was not enhanced by their payment structures. The fee offered to vets was £160 per day (HM Comptroller and Auditor General, 2002: para 3.39). At the same time, valuers were being paid on a much more generous scale. In order to ensure that farmers did not resist the slaughter of animals, valuers were given an incentive to value generously by linking their payment to the value of the livestock destroyed. It became necessary to put a ceiling on the operation of this formula, and this was set at £1,500 per day (*ibid*: para 4.13). In one in every five valuation days, this cap was reached and a sum of £10m was paid out in valuation fees (*ibid*). In essence, the personnel needed to detect the disease in line with the original policy for targeted eradication it were simply not available. Large resources were thrown at the engagement of personnel (largely independent contractors) who facilitated what, we will see, became a blanket slaughter as all but the pretence of detection broke down.

The problems of marshalling resources to deal with FMD were by no means confined to vets. The contingency planning had not foreseen the number and size of the disposal facilities needed to cope with culled animals. We will discuss how disposal actually took place in later work, in which the perverse incentives it created and the lawlessness with which it was conducted will be revealed. For present purposes it is enough to note that none of the necessary contractual arrangements were in place before the outbreak, and consequently had to be negotiated from impossibly weak positions, leading to such extraordinary overpayments (*ibid*: pt 4) that the EU is refusing to meet its contributions to what it regards as ‘excessive and

unrealistic expenditure' (Harrison, 2002). The Scottish waste contractor, Snowie, which is reported to have billed £38.4 million for its work in facilitating the disposal of slaughtered stock, is but one of ten firms billing £10 million or more (HM Comptroller and Auditor General, 2002 table 55).

The very weak contingency planning together with the misplaced confidence in the ability to trace animal movements and operate stamp out effectively meant that in the early weeks FMD spread alarmingly. The turning point came some five weeks after the initial infections when COBR stepped in to co-ordinate the work of all government departments in handling what had by then become a disaster which was out of control. At the time COBR took charge, the contiguous cull policy was introduced. This policy required the destruction on a 'precautionary' basis of 'animals within ... 3 kilometre zones' established around premises believed to be infected (LTBL: 89). The very announcement of this statement caused consternation, since though the policy in effect applied only to sheep and pigs, this was not immediately made clear. There was also confusion regarding the scope of the cull, which from the outset was felt to be 'neither practical nor likely to be legal' (*ibid*: 93). The three-kilometre radius is not accidental but corresponds to the protection zone demanded by EU Directive 85/511, art 9. A protection zone is not, however, by any means a 'cull' zone; the EU conceived of it as a zone within which animal movements would be halted, surveillance of animals maintained, and perhaps vaccination carried out. In the UK, it became a killing zone. Notwithstanding the reduction to a smaller area in certain cases, in large parts of the country such as Cumbria and Devon, the three-kilometre cull seems to have been retained to 'expand' the slaughter (Cumbria Foot and Mouth Disease Inquiry Report, 2002: 41).

The implementation of the 3 kilometre cull was guided by computerised mathematical modelling carried out by the FMD Science Group. This Group, convened under byzantine arrangements which defied such formal constitutional procedures as actually existed in a way entirely typical of the government's response to the crisis, was composed of abstract epidemiological modellers who had almost no knowledge of non-human viral epidemiology and no knowledge at all of agriculture or relevant veterinary practice (LTBL: 91) The way the FMD Science Group worked was described to the Devon Independent Inquiry by Mrs Wendy Vere, a veterinary surgeon:

Their idea was to control the disease by culling in contiguous farms. That is absolutely fine if you are sitting in front of a computer screen in London. However, it is different on the ground. A person in London will just see the numbers and will say that they have to be taken out. That is why it was carnage by computer (Doyle, 2001).

The FMD Science Group modelled an abstract spread of infection from farm to farm in such a way that the rate of slaughter thereby sanctioned was larger than (would 'get ahead of') the rate of infection, and it proved to be the case that the combined forces of the apparatuses of the UK state including its army had a greater capacity to kill domesticated animals than FMD to spread once animal movement restrictions were in place. The cull did stop the disease, but as even those responsible for it had to admit, this approach was 'over draconian' (Highfield, 2001). It took no account whatsoever of the possible variable conditions of spread according to factors such as geography. It made no allowance for natural barriers which might restrict spread. It made no distinction between infected species, let alone infected herds or individual animals. The model almost certainly overestimated long-range wind-spread, for the weight of evidence is that in the case of this particular strain of virus, direct contact or airborne transmission between animals in close proximity were very

much more important vectors of transmission (Beat, n.d.).¹⁴ Finally, no distinction was made between different farming practices in different regions, and the contiguous cull policy allowed for no assertion that a farmer had exercised rigorous biosecurity measures. Typically, *any* farm within a three-kilometre radius had all of its animals (sometimes including domestic pets) culled in a process of ‘postcode slaughter’ (Windsor, 2001).

This indeed was, as the witness to the Devon Independent Inquiry showed great foresight in saying well in advance of LTBL, ‘carnage by computer’. LTBL went on to show that the geographical information system deployed was unfit for this purpose, being that normally used for the purpose of calculating CAP subsidies. The farm location or other geographical information used was simply wrong in a very large proportion of cases. In sum, as LTBL had it:

Information was frequently out of date, on occasion by several years. It was sometimes difficult to pinpoint the location of livestock accommodation within an individual holding, or identify the operator of that land (LTBL: 72).

There are many stories of slaughtermen arriving at the wrong location, but, of course, farmers could not know, however good their own biosecurity, that they were not within a contiguous cull area, and culling will have taken place nevertheless.

Nor was the basic epidemiological data the FMD Science Group was receiving acceptably accurate. At least one in three diagnoses appear to have been incorrect. This is not surprising, given the use of veterinary scientists with no effective experience of FMD, the extreme pressure of time exacerbated by the 24/48 policy (discussed below), and the general climate of horror and panic. However, this figure relates to *confirmed* diagnoses (which were nonetheless wrong). But where there was thought to be no time for confirmation, a policy of ‘suspected slaughters’ was pursued. Four in every five of these suspected slaughters did not involve an actual

outbreak of FMD. It is essential to recall when reading these figures, that each of these suspected slaughters often then involved contiguous farming units within the three-kilometre radius. On average, there would be four such units.

This produced a ripple effect so that, long after the actual spread of the disease is now believed to have peaked, the numbers of animals killed continued to grow. In total, 2,026 farming premises said to be infected produced pre-emptive culling on a further 8,131 premises. In the first week of the contiguous cull, 48,000 animals were slaughtered each day. In two days in Devon 32,000 animals were slaughtered. In the week beginning 25 March, there were 293 infected premises 'confirmed' as suffering from FMD. By the week beginning 6 May 2001 there were 49 such premises, but by mid-May, the daily slaughter had risen to 80,000 animals (HM Comptroller and Auditor General, 2002).

By the end, the Meat and Livestock Commission inform us, over ten million animals had been killed. Perhaps 90% of these animals were not infected. Uninfected animals were killed because they were wrongly diagnosed; were uninfected but at risk; were uninfected and not actually at risk but were contiguous to animals it was claimed were infected; or, most astoundingly, were among the over 2 million animals killed in what may well take the heavily contested prize for the most despicable piece of doublespeak in this episode, the 'Livestock Welfare (Disposal) Scheme', under which uninfected and not at risk animals were killed because animal movement restrictions imposed growing husbandry costs on their maintenance (Uhlig, 2002a).

The contiguous cull policy turned on a target of slaughtering of stock on farms infected or suspected of being infected within 24 hours and slaughter of stock on contiguous farms within 48 hours. This so-called '24/48 hours slaughter policy' is hardly 'immediate', as the language of the basic EU control scheme requires, but is a

impossibly demanding target given the numbers of animals involved. Though this target therefore was very largely unattainable, the extreme haste imposed by the attempt to meet it undoubtedly was one of the reasons the cull was so despicably cruel. This ‘policy’ emanated from a 10 Downing Street lobby briefing. The reader will hardly believe it, even in the context of this story, but no justification was then given or has ever since emerged for this central plank of what has passed for disease control policy (LTBL: para 10.3).

In sum, the contiguous cull was abandoned in all but name. As it became realised that the epidemic was out of MAFF’s control, that the information on which stamp out as publicly justified was based was extremely flawed, and that the implementation times required could not be achieved, all but the pretence of the killing being related to infection or reasonable suspicion of infection was dropped. Mass, almost indiscriminate killing took its place. The leader of the FMD Science Group has acknowledged that the cull was ‘a blunt tool’, but, he claims, ‘in the crisis ... it was unfortunately the only tool available’ (Uhlig, 2002c), the crisis being that MAFF had produced a situation in which ‘the epidemic was not under control’ (LTBL: p. 93). The situation has been accurately summed up in what is by far and away the best UK official comment on the epidemic produced so far, that of the DEFRA Select Committee, which rightly observed that ‘The contiguous cull was a response to a desperate situation, not a pre-mediated response to a known, assessed risk’ (Select Committee on Environment, Food and Rural Affairs, 2002). The so-called contiguous cull was a panic response to a crisis of unknown dimensions which (given the imposition of livestock movement restrictions) stopped the disease because of the gigantic size of the killing. MAFF had no power to kill animals in this way (LTBL: paras 10.3, 17.3), and we will return to this widespread *ultra vires* action in

our subsequent work on the lawlessness of MAFF's action during the epidemic. For now we will merely note that the contiguous cull was a remote, abstract policy relying on bad information and hopelessly optimistic beliefs about slaughter and disposal capacity which achieved its goal only because it decayed into an absolutely unjustifiable massacre.

Perhaps by this time the reader will not be surprised to hear that DEFRA has claimed its response to the epidemic was a success, in the sense that the epidemic was stopped. In DEFRA's first major performance report, Mrs Beckett nobly acknowledged that MAFF/DEFRA had not met its 1998 target 'to prevent outbreaks of serious animal, fish and plant disease' but went on to say: 'This should not diminish the achievement in tackling an epidemic of the scale of the 2001 ... epidemic' (DEFRA, 2002c: 2). We have seen that Mrs Beckett's response to LTBL excused what MAFF did on the basis that the outbreak was unforeseeable. Once this is accepted, then acknowledged 'mistakes of strategy' can be excused as good faith responses to a crisis by 'government officials [who] made heroic efforts to fight the disease' (HM Comptroller and Auditor General, 2002: 4). An emergency does excuse a lack of perfection in one's responses, but not when it was one's incompetence which produced the emergency in the first place! Mrs Beckett's extreme example of rejoicing that one has burned the house down to roast the pig is perhaps easier to understand when one realises that compensated livestock rearers burned down *other* people's houses rather than their own, and that, as we shall see, nothing much has happened to bring responsibility home to MAFF itself, and its own home has remained intact (though its nameplate has been changed).

By far and away the most important aspect of this disgusting episode is that it must have involved the inhumane slaughter of millions of animals and the utterly

despicably cruel slaughter of thousands if not tens or hundreds of thousands. There was ‘barbaric conduct [which] was a disgrace to humanity’, as one of the EU inquiries has been told (Uhlig, 2002b). Under the pressure of the volume of disposal which contiguous cull required as it collapsed into massacre, there was simply no way in which slaughter could have been carried out in accordance with the Welfare of Animals (Slaughter or Killing) Regulations 1995 (S.I.1995/731) and there are scores of reports of animals terrified prior to slaughter, being merely maimed instead of killed outright, being buried and/or incinerated alive, etc. (European Parliament, 2002). There has been no concerted DEFRA or police investigation of this, and, although the RSPCA investigated over 90 complaints (HM Comptroller and Auditor General, 2002: 70), there has not, we believe, been a single prosecution.¹⁵ It is not possible to set out what took place briefly in this paper as, also disgracefully, this mass criminality also is downplayed to a very great extent in the official reports, and so an accurate account will have to make extensive reference to primary materials. In future work, we will collate the evidence of this mass criminality as part of our argument about the climate of lawlessness which prevailed during the epidemic.¹⁶ For the purposes of this paper we want merely to say that the belief that stamp out ever could be a humane way of dealing with an epidemic (rather than an isolated outbreak) turned out to be a most wicked falsehood.

We could go on, for we have merely outlined the incompetence which MAFF showed during the epidemic. But our purpose here is not to provide exhaustive evidence of this incompetence, for perusal of the official reports readily yields that evidence, but to set up the following discussion of the question not adequately answered or even posed in those reports: how could MAFF ever have got itself into a position where rearing practices, for the regulation of which it was completely

responsible (and over which, through CAP subsidy, it exercises crucial financial control), caused a harm which it pleads in its excuse that it did not foresee?

Coase, blackboard economics and FMD

The basic character of the disease control policy which so gravely failed in 2001 is that it treated disease control as a public good, and what we want to show here is that this failure is, in important respects, traceable to the public character of the disease control regime. In particular, we want to show that the only general explanation that can be given for so poor a performance by MAFF is that it had unreasoning confidence in its policies precisely because it had never properly assessed their plausibility as concrete regulatory measures. That public interventions have been beset by a crisis of effectiveness (Hawkins, 1984), and necessarily therefore of authority (Nonet and Selznick, 2001: 4-8) or legitimacy (Habermas, 1976: 24-31), and that this requires a fundamental 'reconceiving' (Sunstein, 1990) of the nature of the '(re-)regulatory state' (Majone, 1994), has been the commonest currency of regulatory theory during the post-war 'age of regulatory reform' (Button and Swann (eds), 1989). Some of the contributions to this 'reconception' are of great sophistication and, indeed, sometimes complexity and difficulty. Their core notion of 'reflexivity' (Teubner, 1993) or 'responsiveness' (Ayres and Braithwaite, 1992) does, we will argue in future work, have a role to play in the reform of FMD policy. However, we feel that the errors that led to the foot and mouth epidemic which we want to discuss in this paper are subject to perfectly straightforward criticisms: these policies were, as Ronald Coase has it, purely abstract 'blackboard economics'. Merely the fact that there was public regulation of FMD seems to have been enough for MAFF to believe

it had the problem under control; and this illusion of regulatory capacity hid an enormous risk which, in the end, blew the illusion apart.

The criticism of MAFF's FMD policy as blackboard economics is a most disturbingly easy argument to make, which is itself a point of note. The fullest account of the nineteenth century origins of FMD control policy (Woods, 1999) shows that 'control by the state occurred almost as an afterthought' (Woods, n.d.). Looking merely at the situation prior to the epidemic, we find that there was *no* official consideration, or therefore defence, of treating FMD control as a public good; and one can hardly be surprised that regulatory policy formulated with this frame of mind has collapsed when placed under strain. Two uncannily striking resonances with Coase's criticisms of unwise intervention show just how disgracefully feeble was MAFF's regulatory policy.

Much of the 'law and economics critique' of state intervention traceable to Coase has now become a commonplace in regulatory *theory*. So generally accepted are the points Coase has championed that his distinction now seems to lie not in the startling novelty of what he says but in his being often half a century ahead of his time. For example: in the 1950s he advocated the allocation of broadcasting wavelengths by an auction rather than by the direct choice by a bureaucracy, with the result that at a Federal Communications Commission hearing at the time, a Commissioner, who evidently subscribed to the then overwhelming Pigouvian welfare economics consensus that it was simply inconceivable that these goods could be allocated other than bureaucratically, accused Coase of playing a joke on the hearing. That Coase now points to this episode with some self-satisfaction surely is excusable (Coase, 1998); it is he who has very largely demolished the assumption central to the

Pigouvian consensus, that intervention will supply superior outcomes to market allocations in cases of market failure.

Coase's argument against Pigouvian welfare economics strikes both at the identification of market failure and at the adequacy of intervention as a response to what are claimed to be market failures. Coase hardly denies that there are market failures. Indeed, it is the burden of the concept of the transaction cost which he has done so much to make central to economic thinking that, as general competitive equilibrium can occur only when transaction costs are zero but in the empirical world transaction costs are always positive, market failures are ubiquitous. When one is actually claiming to observe a market failure, one cannot really be pointing to the fact that allocations are not perfectly efficient, for there can be no more mundane observation. One must be pointing to a state of affairs one both thinks bad and which, implicitly at least, one thinks could be improved by intervention. Recognising this, it becomes clear that even if one identifies a market failure which it is thought right to try to correct, it is not enough to ground intervention to point to that failure. One must show that the alternative of intervention would be superior to what the failed market has done. Simply to advocate intervention because one is dissatisfied with the market is a flat *non sequitur*. One's perception of 'market failure' must be complemented by a perception of 'government failure' when making choices between alternative governance structures for the allocation of economic goods (Coase, 1964:192,195).

Whatever the position that now obtains in regulatory *theory*, regulatory *policy* as exemplified by MAFF's FMD control policy evidently is subject to both limbs of Coase's critique of intervention, though we shall only briefly discuss the former. Unless by market failure one means a failure to conform to the theoretical welfare optimum reached at general equilibrium, when of course FMD control is a market

failure, as is every allocation of every good, then that there is a market failure in respect of disease control is by no means soundly established. Indeed, it has never been soundly established that doing nothing about FMD other than endure it might not be the wisest policy, and though we cannot argue what we acknowledge is a contentious point here, we can say that the case that stamp out alone is the best policy certainly has *never* been made (Woods, n.d.). And this being so, that it is wise to treat stamping out as a public good cannot be safely assumed as the first limb of such an argument is too weak. We do not want to enter into an argument about what should be done but show how MAFF decided what should be done. And there is, in the light of what actually happened in 2001, not an amusing but a shocking resonance with Coase's critique of Pigou. In *Wealth and Welfare* of 1912 and in all editions of *Economics of Welfare* up to the 4th and last of 1932, Pigou gave 'the Interstate Railway Commission of the United States' as an example of a public body that would make things better (Pigou, 1932: 334). In one of his most telling jibes, Coase shows that this was merely throwaway; Pigou didn't even get the name right:

In all editions the Interstate Commerce Commission is referred to as the Interstate Railway Commission, and this body, created in 1887, is always described as 'recently developed,' which does not suggest any real interest in the subject (Coase, 1988: 22).

In essence: 'Pigou never seems to have thought it necessary to inquire whether his optimistic opinion about [this commission] was justified by events' because he was of a cast of mind that assumed 'the existence of (almost perfectly) functioning public bodies' (*ibid.*).

The way MAFF became committed to stamp out as a response to the 2001 epidemic is not one whit superior to Pigou's reasoning over this commission. '[B]ecause of other priorities and a shortage of available resources', MAFF had never undertaken a specific risk assessment of FMD (IDL: para 2.15). In the course of the

piecemeal accumulation of various provisions and plans that, together with the gaps between those provisions and plans, constituted MAFF's FMD policy, MAFF 'had not formally consulted other key stakeholders, such as other government departments, local authorities and representatives of farmers and the veterinary profession' (HM Comptroller and Auditor General, 2002: para 2.53-2.57). To the extent that its FMD policy was based on any fundamental evaluation of its costs, it was very largely based on a 1973 cost-benefit analysis using data from the 1967 outbreak (Power and Harris, 1973), and so 'the economics of slaughter do not seem to have been recalculated for decades' (Brown, 2001)! In what must be regarded as a masterpiece of understatement, LTBL (para 14.4) concluded that an updating of the costs and benefits used in the cost benefit calculation 'is overdue' because a 'number of factors is likely to have changed since the 1960s'. What can one say about all this other than that, in a most important sense, MAFF did not really have a FMD policy at all prior to the 2001 outbreak? If one had any confidence whatsoever in public law challenges to MAFF's actions, one would argue that those actions manifestly were *Wednesbury* irrational (*Associated Provincial Picture Houses v Wednesbury Corporation* [1947] 1 KB 223). But in addition to all the facts about the nature of the rural economy (Roberts, 2001), what also has changed since 1973 is regulatory *theory*; the 1973 analysis did not even consider alternatives to direct state governance and nor subsequently did MAFF.¹⁷ MAFF simply assumed treating disease control as a public good would be the best thing, and took no real pains to confirm whether this was indeed the case. This is to say that MAFF fell appallingly short of the standards of remotely competent current regulatory theory.

Any improvement on this must, of course, turn on an awareness of the costs of government intervention. What now seems amazing but certainly was the case in

welfare economics and regulatory theory and policy based upon them until quite recently, is that it typically was inadequately recognised that government intervention also involves transaction costs, and that this can lead government bodies to ‘fail’ as well as markets. Given that the public bodies are themselves imperfect, there is no necessity for intervention to be superior to the market even when the market is shown to have failed. An intervention may be shown on the blackboard to offer a theoretical solution, but the reason it appears to do so is that its own costs are very inadequately estimated because there is an underlying assumption that the intervention will be carried out by more or less efficient public bodies. The plausibility of the interventionist solution rests on the inaccurate underestimate of the cost of intervention. Solutions which work well on a blackboard but are developed without sufficient sensitivity to the problems of their being implemented are very likely to be useless or pernicious when they actually come to be implemented. When, for example, Baumol replied to Coase’s attack on Pigouvian taxes for the regulation of pollution but admitted that ‘[w]e do not know how to calculate the required taxes and subsidies and we do not know how to approximate them by trial and error’, Coase in turn responded:

Apparently what Baumol meant by saying that “taken on its own grounds, the conclusions of the Pigouvian tradition are, in fact, impeccable”, was that its logic was impeccable and that, if its taxation proposals were carried out, which they cannot be, the allocation of resources would be optimal. This I have never denied. My point was simply that such tax proposals are the stuff that dreams are made of. In my youth it was said that what was too silly to be said may be sung. In modern economics it may be put into mathematics (Coase, 1988:185).

In the absence of MAFF doing any of the necessary thinking, the main argument for treating FMD control as a public good is, so far as we are aware,¹⁸ to be found in the two papers by Professor David Harvey of Newcastle University, one written at the height of the epidemic (2001) and one after it (2002). In these papers,

which are the most sophisticated and honest (if appallingly mistaken in our opinion) welfare economic consideration of FMD policy of which we are aware, Harvey frankly considered the alternatives and their consequences and concluded that stamp out should be pursued. Estimating the costs of the doing nothing about FMD at £1.2 billion *per annum*, and, (as he estimated in advance of official estimates) the cost of the 2001 epidemic at £10 billion, he concluded that ‘we can afford such an expensive epidemic once every ten years and still come out ahead’. Now, there is much that one can disagree with in Harvey’s work even on its own terms; in particular that he gives no weight to ‘public disgust’ against the cruelty mass slaughter without vaccination must involve when, should such a weighting be given a plausible value, it will, as he allows, probably mean vaccination would be inevitable.¹⁹ But arguments of this nature really boil down to lack of confidence in the numbers used in much welfare economics, and whilst we will return to this in a critique of Harvey in later work, let us confine ourselves within the methodology of that work.

What must be pointed out is that, in the absence of the requisite work by MAFF, Harvey was himself basing his estimates largely on Power and Harris’ 1973 paper, though he at least attempted to make adjustments to certain of their figures to bring them up to date. Harvey is an academic not a public body and it is hardly his fault if these sometimes heroic adjustments are the best he could do; but it does mean his figures, and the conclusions he reaches on the basis of them, are unconvincing. He himself saw this and in his earlier paper he lamented that: ‘the quality of the present debate about the epidemic seems to neatly match the quality of the production and management systems which started it. We can and should do much better than this’; ‘one possible benefit of the present crisis is that it might encourage us all to do just that’. The point we are obliged to make is that there is no reason whatsoever based on

what has happened over FMD to maintain this optimism, other than a blackboard economics confidence in public provision of services, which indeed is Harvey's political position on the evidence of his first paper: 'The current and long-running fashion for denying collective responsibility and public service in favour of the worship of individual rights and opportunities is as nasty a virus as the foot and mouth disease itself. We would do well to be rid of both'. Whatever sympathy one may have with these sentiments, Harvey's argument shows just how weak the left-wing economic policies have been which have allowed this fashion to maintain such a hold. In his earlier paper, Harvey maintains his position about FMD control as a dogma: that such control should be provided as a public good 'is not a conclusion which depends on empirical evidence. It is a logical consequence of the inherent nature of the phenomenon'.

If we ignore Harvey's stricture²⁰ and turn to the empirical situation, we can see that, Harvey's calculation to be compelling, epidemics cannot cost more than £10 billion and/or occur more frequently than every ten years (amongst other conditions). In his earlier paper, Harvey was of the opinion that confidence could be had that these conditions would obtain, indeed, in there being an improvement. The individual cost of future epidemics could be reduced ('we can almost certainly improve the speed of response and necessary culling') and frequency ('we surely can learn enough from this present catastrophe to avoid such frequent occurrence'). Unfortunately, as he conducted no analysis of the disease control policy formulation process in papers preoccupied with mathematical manipulation of the wholly questionable data, he had no evidence for this whatsoever. His earlier paper indicates some improvements which might be made; his later paper is unable to adduce any reason to think any positive changes are being undertaken, and so long as they are not being undertaken,

then none of the conditions on which his conclusion about stamping out is based can be said to obtain. Harvey does not change his basic opinion about treating disease control as a public good, but he is honest enough to realise that there is no empirical evidence for it:

Full exploration of the effects of alternative disease control measures, in the context of alternative general farm and rural policies, appears to be what is required for politically and publicly relevant policy analysis and advice. However, we do not have this capacity, and we do not appear to be developing it. To satisfy this requirement, we would need a fully integrated modelling system of the interactions between land use, environmental, landscape and wildlife, coupled with a sensible modelling framework of individual and collective behaviours and valuations, embedded in a consistent account of the circular flows of income and expenditures, and, in the case of FMD, a spatial model of disease transmission. No doubt we already have many of the elements of such an integrated understanding of these systems. But, until we attempt to bring these together and test them against observed realities, we are condemned to running such analysis largely in our heads, and this personalising them and subjecting them to continual contest and argument. The FMD outbreak did not alter any of these circumstances and conditions. It merely highlighted our ignorance and demonstrated our individual and collective lack of public responsibility.

There is no need to attack Harvey's longing for a completely adequate plan of complex systems, the absence of which is the perennial lament of the welfare economist. Harvey recognises that the UK disease control system cannot even be said to be aspiring to rational improvement of its planning function. In our opinion, the only explanation of his is his own residual commitment to treating FMD control as a public good is his being enmeshed in the blackboard economics of intervention; in which, it will be recalled, no empirical evidence need be adduced for treating an activity as a public good. Having some idea what happened in 2001, we cannot repeat the winning levity with which Coase made his point, though we wish to apply the point: what was too silly to be said was heard in the cries of thousands of appallingly tortured animals.

As MAFF's reasoning since the 1967 outbreak has not been conducted at as sophisticated or at remotely as honest a level as Harvey's, it is not at all surprising that a disgraceful situation obtained in which the second limb of any adequate argument for intervention over FMD – that government action will improve the situation – was, in fact, appallingly weak. Stamping out works *if* FMD can be quickly detected; *if* it can be quickly localised; *if* infected and at risk animals can be identified, slaughtered and disposed of quickly; and *if* other appropriate precautionary measures can be quickly put in place. This may well happen in a small-scale outbreak. But under MAFF's amazingly complacent supervision, everything was put in place to turn a small-scale outbreak into a major one. Livestock rearing practices, especially mass movement of live animals, which are apt to turn an outbreak into an epidemic were adopted and these rendered MAFF's contingency planning, centered on an epidemiological model which massively underestimated the size of the threat, absurd blackboard economics.

Stamp out was intended to kill off an outbreak quickly. Persistence in it when it was realised that the outbreak had become epidemic was flatly barbarous. Stamp out could be thought a sensible response to a large-scale outbreak only because it was never properly costed for that purpose (the very thing, it will be recalled, MAFF pleads, and the NAO accepts, is in MAFF's defence). Little or no thought was given to the costs of actually implementing stamping out. It was especially foolish that no thought was given to the costs it would impose on farmers unable to move stock but ineligible for compensation, or on the tourism industry, or on those living near pyres. We will turn to these aspects of the disaster in future work. They are eclipsed by the horror of the panic slaughter.

Those who, like ourselves, eat meat in the belief that livestock will be humanely killed must realise that, unless there is radical change, this will not be the case. Animals which provide meat will be killed humanely. But behind them there will inevitably be huge numbers of animals cruelly killed in the panic, mass slaughter which has been the government's response to the epidemic which its agricultural policies caused. Fortunately, now that the call for better contingency planning is leading to stamping out being more accurately costed, the EU has concluded that the stamp out policy "cannot continue in its present form" (European Parliament, 2002: para. 11) and the use of stamp out alone will almost certainly be abandoned in the UK (Hetherington, 2002). The likeliest response is that it will instead be supplemented by vaccination prior to slaughter, as it may be in the rest of the EU. Widespread use of vaccination in this way may improve the handling of the disease and reduce the amount of appalling cruelty because it will probably give the government more time to think before slaughtering. But nothing will rationally address the problems if current intensive rearing practices and the mass movement of live animals continue unheeding of the risk they create. These rearing practices will always threaten to turn an outbreak into an epidemic because they turn contingency plans into the merest blackboard economics. If those practices are not changed, we are headed for another catastrophe even if vaccination is adopted.²¹ And if vaccination is not adopted, stamping out is again bound to decay into mass, cruel slaughter when the next major outbreak occurs. Though exclusive use of stamping out may be abandoned, none of the other questionable practices would appear to be being subjected to sufficiently radical scrutiny; and the consequences of this are all too easy to predict.

Sadly, not a conclusion

As this was first drafted, a stupid resumption of the very practices that caused the epidemic was begun. Movements of live animals have started again, including the cross-channel shipment of live lambs. This not only raises very serious animal welfare problems (Food Ethics Council, 2001: recommendation 14) but obviously constitutes a grave risk which at present the livestock industry ignores. The Autumn livestock auctions pending as this was first drafted involve millions of animal movements, and so pose a tremendous risk. DEFRA had announced that it did not intend to lift the 20 day standstill order on livestock movements during the sales. DEFRA had no real choice over this as it has not devised alternative biosecurity measures; but as no alternative policy toward livestock sales has been developed either, the standstill would mean huge disruption of these vital sales and, in turn, great losses to farmers. In the now commonplace fashion, the relevant official announcement was preceded by a leak by government, this time through the BBC's *Farming Today* programme broadcast on 30 July 2002.²² With breathtaking contempt for public opinion, interviewed on that programme, Robert Forster, Chief Executive of the National Beef Association, gave his opinion that farmers would not observe the standstill, and indeed it has been largely ignored! The obvious conflict has been avoided because DEFRA, entirely predictably, backed down in all but name, granting huge numbers of exemptions to the standstill rule.²³

There have been a number of FMD scares since the epidemic, one of which in particular involved animal movements very like the ones which started the 2001 epidemic. The animals involved *were not tagged* (Connor, 2002), though we have seen that DEFRA's strategy entirely depends upon this happening. The farmer

responsible simply disregarded the precautionary measures, and they collapsed; nothing in the MAFF control system prevented this from becoming another epidemic. It has not been possible to trace the farmer responsible (Wilson and Hetherington, 2002), but this is hardly surprising. Experience overwhelmingly tells us that economic regulation based on criminal sanctions is unlikely to work, and that financial incentives are a superior regulatory mechanism. It is a sickening joke²⁴ that whilst the animals involved in this scare were not tagged, the pig finisher DEFRA claims was responsible for the 2001 epidemic – Bobby Waugh - *was* tagged as part of his home curfew (Herbert, 2002). Waugh's rearing practices were, as we have noted, certainly bad, but as they were common, this is fruitless scapegoating. Effective criminal sanctions require an impossibly costly inspection regime and are bound to be outrun by the risks created by the resumption of the rearing practices which caused the epidemic.

The only general change is that MAFF will no longer be in charge of the situation; but this change is, we are afraid, part of the problem, not part of the solution. In this paper we have tried to explain the unreasoning confidence in the stamp out policy in terms of its resting on a blackboard economics assumption about the effectiveness of intervention. The official response to the catastrophe takes us away from this argument, for we seem to be entering into the area of 'public choice' criticisms of government policies not so much in terms of inadvertence, even gross inadvertence, but in terms of those policies being consciously framed to suit the interests of the public bodies and the private interests which have captured them (Hood *et al*, 2001). In June 2001, the completion of a huge restructuring of departments, heavily influenced by FMD and other huge policy failures by MAFF, meant that, in essence, the agricultural policy component of MAFF, with its existing

personnel, became DEFRA. But the comfort one takes from this is limited by an awareness that such mere changes of name do not always lead to clear increases in welfare, and, as we have seen, DEFRA is, overall, reasonably content with what it did over FMD in its previous incarnation. Nevertheless, some residual naivete or credulity for which, to be frank, the research of which this paper is the first substantial output lends no support whatsoever, leads us still to hope that the creation of DEFRA is not entirely analogous to the creation of the GPU, or State Political Administration, by the Bolshevik regime in February 1922, to replace the Cheka, the hated secret police. It is by no means clear that this change of name led to an improved situation, perhaps because this ‘change’ also involved so few leading personnel that ‘hardly a Chekist stirred from the Lubianka’ (Gerson, 1976: 222).

As we not merely continue to look into the abyss but resume digging it, it is as well to ask why, and in future papers we will make the remaining two of the three claims we outlined in the introduction to this paper. First, we hope it is now clear that the one-sidedness of the policies being adopted even after LTBL, which concentrate on improving contingency planning and pay little or no attention to the creation of risk, is ridiculous, and must lead to further blackboard economics errors. We could, let us allow, completely control FMD with sufficient investment in contingency planning, but if the hazardous livestock rearing practices continue to run ahead of the biosecurity measures, then, unless the disease control budget is infinite, we must fight a losing battle: any measures devised will be reduced to mere blackboard economics out of proportion to the risk posed by rearing practices which undermine those measures. In a subsequent paper we will argue that it was the very treatment of FMD control as a public good which was at the heart of MAFF’s disease control policies

that led to livestock rearing practices being devised without rational appreciation of the costs of disease control. These costs may in this way be made external to the livestock rearer and dealer, but they are made external to this group only by being imposed on others. This could happen only because the policy environment of disease control involved lawless action by government on such a scale as to amount to a negation of the basic precepts of the rule of law. In these circumstances, it has seemed not only possible but merely part and parcel of the conduct of government that dealing with FMD could involve immense, cruel slaughter, and the consequential costs of this slaughter be transferred from those causing the risk of harm to other parties.

NOTES

* Cardiff Law School and ESRC Centre for Business Relationships, Accountability, Sustainability and Society (BRASS). We are grateful to Louise Croker and other colleagues in BRASS for their interest in and assistance with this paper, and to Pat Gardiner for his comments.

¹ As we shall argue, the information available to MAFF was abysmally poor, so poor indeed that the numbers of infected animals will never be known with reasonable accuracy. As we shall also argue, MAFF's response to this was to the huge slaughter of animals which could not reasonably be suspected of being infected. The Countess of Mar may well have been perfectly accurate, then, to claim that doubt whether the 2001 epidemic was the largest outbreak ever known, but to insist nevertheless that 'it was the one in which most animals were killed' (HL Deb, vol 630, col 911, 14 January 2002).

² This paper does not attempt to measure the total impact on the UK but only the financial impact on agriculture, food production and tourism. In the light of the

intractable methodological difficulties of wide-ranging economic calculations of welfare, this no doubt is wise, but it does mean that the £9 billion figure is in an important sense an underestimate of the harm. There are other estimates merely of the purely financial cost which are far higher. On the other hand, Harvey (2001) argues that much of the losses in tourism were not complete losses to the economy as the tourism revenues were diverted into other sectors.

³ This document, a response ‘supported by all departments and agencies of Government’, is not attributed to any specific author but presumably was co-ordinated and approved by The Prime Minister’s Office. It is an attempt to ‘spin’ even this story, and its executive summary in particular contains as many falsehoods about MAFF’s performance during the epidemic as human ingenuity is able to cram into the space available. It is a despicable document.

⁴ This became a highly contested issue during the epidemic: see n 14 below.

⁵ Though we cannot go into the detail of this here, we must point out that, in the context of CAP, it is by no means clear that investing in FMD control to prevent even these losses would yield any sort of gain at all. For example: milk production under CAP is subject to heavy direct subsidy and much milk is simply destroyed. Is there any gain *at all* in maintaining high efficiency in the output of such a product?

⁶ This comparison is said to be ‘incorrect’ in IDL (para 3.9), and indeed it is for animals in acute disease states and young animals, which are the categories to which IDL refers. But for the great majority of adult animals it is correct, and this is merely another instance of a case where it is impossible not to question the good faith of the authors of official scientific statements about risk.

⁷ We suspect it may have been, in the most important sense, an irrational decision as an important component of post-war FMD policy has been an attempt to maintain a trade barrier against imports even of animal products from countries which do not enjoy FMD free status. The origin of the goal of freedom from FMD in the nineteenth century had a quite different (itself highly questionable) rationale: the protection of the stock of a group of extremely influential British pedigree breeders, who managed to impose this goal (and its costs) against the interests of common livestock rearers (Woods, 1999).

⁸ To this must be added the costs of lost exports, for under the World Trade Organisation's agreement on the Application of Sanitary and Phytosanitary Measures, maintenance of 'disease-free status' is essential to allow exports to a number of countries (IDL: ch. 4). Harvey (2001: table 1) puts these costs at *circa* £500 million *per annum*. Leaving aside possible objections to this figure, it follows from a trade policy (for which the U.K. is largely responsible) which broadly accepts the goal of FMD eradication, and, from a theoretical if not immediately practical perspective, the circularity of using it to establish that policy is manifest (as Harvey allows).

⁹ Behind animal movements lies the even more basic issue of the intensity of livestock rearing, for it is a very highly plausible hypothesis that, given the nature of the FMD virus, the risk of FMD will directly vary with that intensity. This would seem to be supported by analysis of the 1967 epidemic which has shown that only 1% of dairy herds with less than 10 cows were infected, in contrast with 29% of herds of over 80 cows: IDL (para 3.15). We shall not go into this because, so far as we are aware, the basic information which would allow one to make at all precise statements has not been collected.

¹⁰ This is pointed out by the campaigning website, Warmwell, which draws attention to the fact that Dutch versions of the spread of the disease are impossible to reconcile with official views in the UK, as the Dutch trace their own source of infection to a French staging post at Mayenne: see further www.warmwell.com/30Julydate.html.

¹¹ In a lecture at the Royal Society on 12 November 2002, David King, the government's Chief Scientist, put this figure at 120; cf. LTBL (51), which reports 57 infected farms in 16 Counties.

¹² COBR is also known by the acronym COBRA as the room in question is Briefing Room A.

¹³ This statement by the Secretary of State was made on the date the *Lessons to Be Learned* inquiry reported. Prior to this, it is fair to say that the government had largely publicly celebrated MAFF's performance: see n 3 above.

¹⁴ It would appear that MAFF almost always refused to legally contest livestock owners' refusals to participate in the contiguous cull. The only legal defence MAFF mounted of the cull turned on a claim about the extent of airborne spread, for this is the only remotely conceivable way the cull could actually have been of animals which might at all reasonably be suspected of being infected. For the future, the point may be otiose, for by taking the trouble to pass the Animal Health Act 2002, which gives DEFRA the right to kill any animal whether suspected of infection or not, the government is effectively acknowledging it did not have the power to do this when it did it in the past. We will address these issues in our work on the unlawfulness of MAFF's actions during the epidemic.

¹⁵ A prosecution was mounted in Cardiff in September 2002. The ghastly facts were that a slaughterman was taking multiple pot shots at animals from distance (Hall,

2002). This slaughterman was acquitted of offences under the Health and Safety at Work Act 1974 (the risk being that of possible harm to humans from ricochets!) but his employing local authority was convicted and fined £100,000.

¹⁶ One example – by no means the most harrowing of which we are aware - will suffice here. The following is a report of an interview by Mr Nick Green, a Cumbrian environmental activist, of a vet working at the Great Orton disposal site:

Once again, imagine you were helping to kill literally thousands of healthy lambs daily. Little lambs, petrified and calling out in desperation for their mothers, who had probably already fallen to the captive bolt gun and pithing rod. Sadly, these lambs would not be allowed this easy route. You see, lambs are hard to kill. They have very soft skulls and the captive bolt gun, used under the orders of the veterinary surgeons, do not kill the lambs. It simply compresses, viciously, their skulls and tears apart their lower jaw. They do not die, they are still very much alive and are thrown down to join the ever growing pile of wriggling, suffering and terribly frightened little animals. They then had to be pithed to kill them and in some cases were also “vented” [had their throats cut]. Imagine holding a day old lamb. Imagine a Spanish [temporary vet], barely able to talk English. Imagine this vet attempting to administer a needle into the heart of this little creature. The lambs were never sedated. Imagine having to hold this little thing whilst our vet has five attempts at killing this lamb. Imagine seeing four broken needles sticking from the chest of this animal.

This report, and a very great deal of material to similar effect, is posted at

www.warmwell.com

¹⁷ In the aftermath of the 2000 outbreak of classical swine fever, MAFF did form a working party to discuss the use of private insurance in disease control but we have been unable to find any outcome of these discussions.

¹⁸ Being unable to draw on any official arguments, the House of Commons Research Paper which was the principal source of information for concerned MPs during the epidemic was more or less entirely based on Harvey’s work (Barclay, 2001: 22-26).

¹⁹ See also n 8 above.

²⁰ Harvey's 'logical' approach to the identification of a public good cannot survive Coase's (1988, 187-213) critique of the way the lighthouse was used as an axiomatic example of such a good, which both destroyed that logic and, in a characteristic Coase touch, showed that in fact there was a perfectly thriving private market in British lighthouse services prior to 1842, which was ended only by the state buying the private lighthouses at enormous expense!

²¹ This was argued throughout the epidemic by Farmers for Action, a campaign group organised by farmers opposed to the NFU's slaughter policy and, indeed, to the NFU itself: <www.fmdaction.il2.com>.

²² We are grateful to the BBC for supplying a tape of this programme.

²³ 23 January 2003: the standstill is to be reduced to 6 days from 4 March 2003 (the results purportedly to be assessed by 31 July 2003).

²⁴ Made by the Editor of the *Independent* who ran the relevant news items together on the front page.

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