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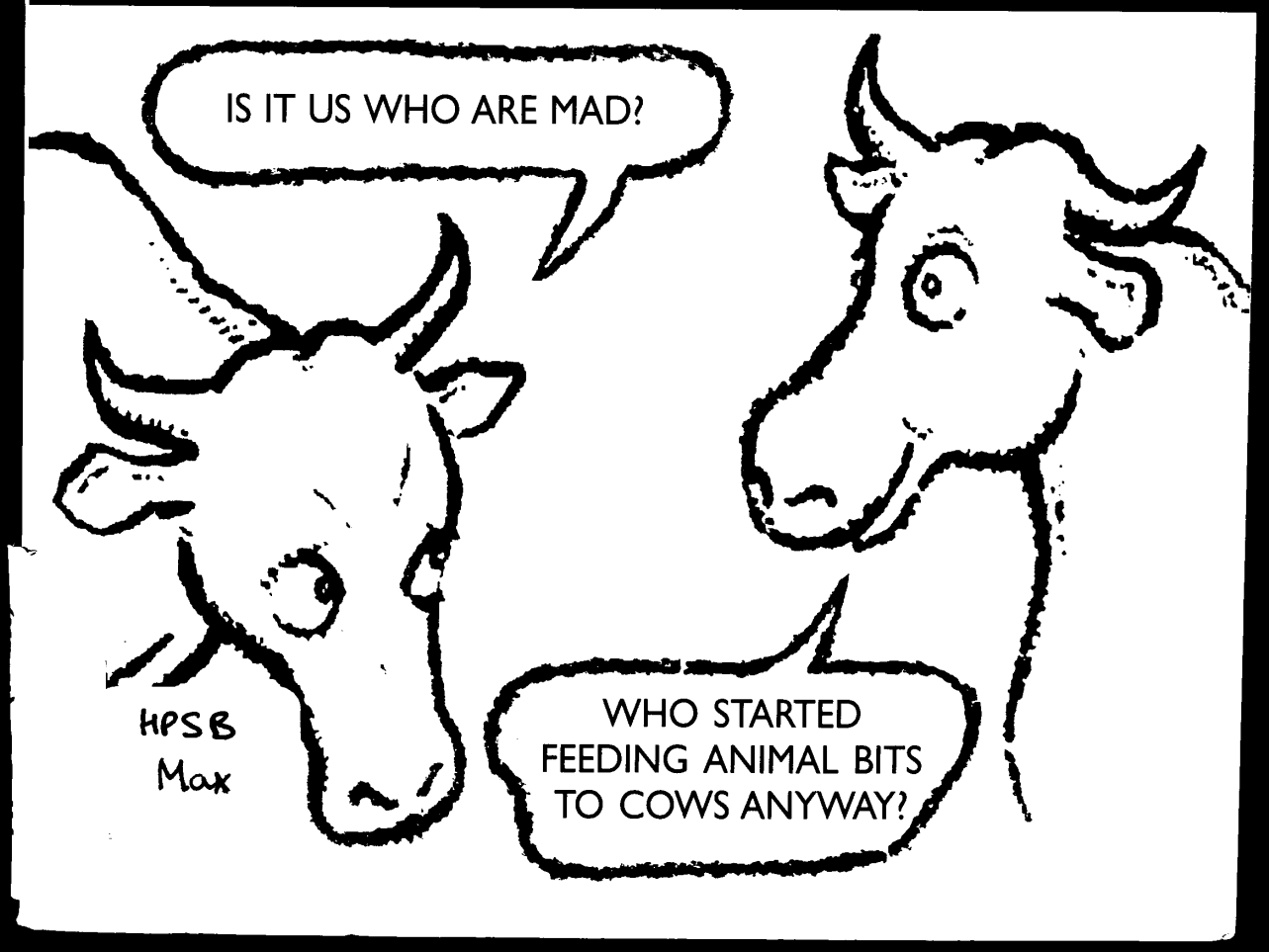
An Unplayable Hand?

BSE, CJD and British Government

Robert J Maxwell



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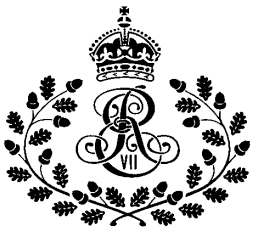

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Introduction

Take a new disease in cattle, for which the transmission route and the disease process are not fully understood, and the incubation period is long (so that whatever caused it must have happened a long time before, and there is likely to be a substantial amount still to come, whatever is now done). Distribute the disease widely among herds, albeit with low infectivity and low incidence in any one herd. Make the disease fatal. Show that the infectious agent, whatever it may be, is extremely difficult to eradicate from the dead carcass. Raise the possibility, thought to be remote, that the disease may be transmissible from cattle to humans. Try then to formulate and implement policies to combat the danger of transmission, without creating panic.

Discover, ten years later, when the understanding of the disease in cattle remains very limited, that there have recently been ten cases, each isolated, of a similar and equally fatal disease in humans, at an earlier age than previously reported. Suggest that these deaths *may* be linked to the disease in cattle. Postulate a causal link, despite the lack of clear epidemiological or microbiological proof. Finally, because trade in meat, animal health issues and veterinary controls are all matters that fall within European Union competence, add a European dimension. Bovine Spongiform Encephalopathy (BSE) in Britain immediately becomes a highly sensitive matter within Europe. The European dimension is equally sensitive (for different reasons) in British domestic politics.

It is hard to conceive a more lethal cocktail of issues for any Government to handle (see Box 1). Was it an unplayable hand? The hard truth is that while Governments can be desperately unlucky in the cards that they are dealt, they

Box 1

BSE in Parliament

Peter Hardy (MP, Wentworth)
'Does the Minister not realise that, in more than a thousand years, the British people have developed an innate genius for producing and dealing in livestock and domestic animals, and that the Government's incompetence and inadequacy has (sic) brought that historic record into sheer derision?'

Professor Tim Lang (Thames Valley University)
'BSE has changed the food policy landscape within (which) consumers think, act and eat.'

Mr Colin Pickthall (MP, West Lancashire)
'There is something particularly insidious about the feeling that one's food may be contaminated.'

Mr Paul Marland (MP, West Gloucestershire)
'This is the biggest crisis that has ever hit the UK food industry.'

Mr Mark Robinson (MP, Somerton and Frome)
'The BSE crisis has been the most serious for the British farming industry that working farmers can remember.'

Mr Barry Sheerman (MP, Huddersfield)
'BSE has been a tragedy for farmers, for consumers and for the animals that are being put down and burnt rather than living until the time when they would normally go to the market.... We know that there are great pressures on the farming community and none is so great as that of the demand for cheap food. ... The pressure to do things on the cheap ... lies behind the problems affecting the British farming industry.'

Sources: All quotes, except that from Professor Tim Lang, are from House of Commons *Hansard* for 17th February 1997: Opposition Day Debate on the BSE Crisis. The quote from Professor Lang is from the Agriculture and Health Committees' Joint Report: *BSE and CJD: Recent Developments*, 1996, p. 140.

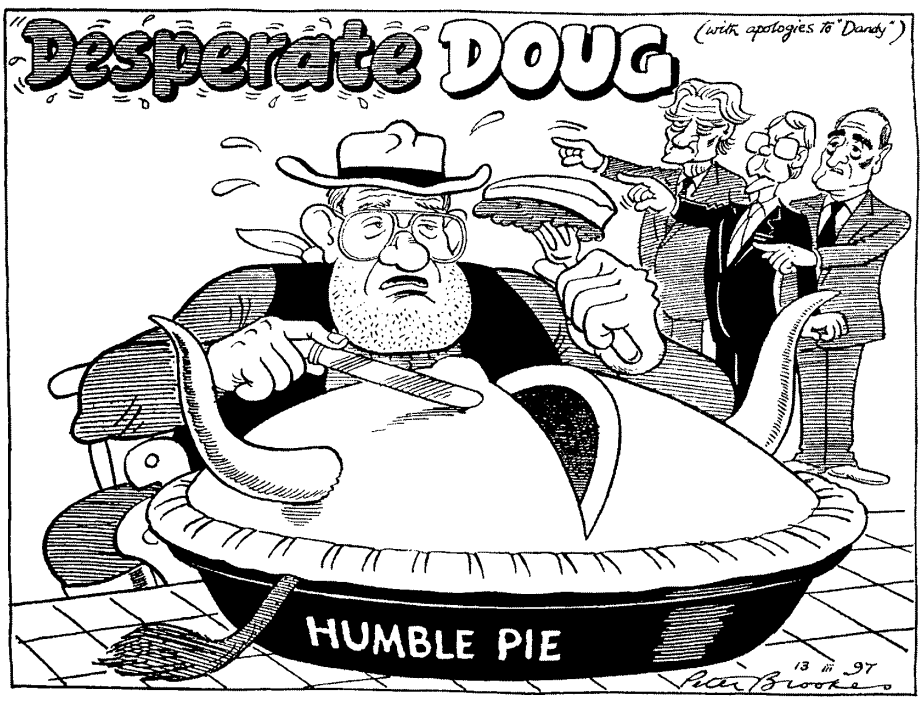
cannot regard any hand as unplayable. They must either bid and play it, or resign. This paper sets out to describe and analyse what has happened in this case – particularly the interaction of science, policy and politics – in order to see what we can learn. While we can be sure that this particular story will not be repeated precisely, we can be equally sure that something else – some other set of circumstances endangering human health – will happen. Issues such as the political handling of risk, and the public explanation of uncertainty, arise in this case, and will arise again. They merit reflection before they do.

It is not the intention of this analysis to find fault with individuals. That is not the point. Anyone writing about these events now, with benefit of hindsight and yet when it is too soon for a definitive view, ought to be extremely careful not to jump to conclusions about individual blame. Mistakes were made, but it may be the case that none of us would have done any better, faced with the same problems. That is not to deny the importance of Ministerial accountability. By tradition, Ministers are expected to take personal responsibility even if they are not personally at fault (see Box 2).

The way that the story will be told is first to examine the BSE crisis as it emerged in Britain in the late 1980s and the actions then taken. Second, to attempt to summarise the emerging scientific knowledge of the spongiform encephalopathies, the complex group of diseases to which BSE and Creutzfeldt-Jakob disease (CJD) belong. Third, to track and analyse the events that began early in 1996 when SEAC (the committee of scientists that advises the Government on this topic) decided that the new-style cases of CJD implied a shift in the balance of probabilities. For the first time a causative link between eating infected beef and the development of CJD became more than a remote possibility, although still by no means certain. Finally, a fourth chapter seeks to draw out the lessons, while recognising that the story has by no means ended. We still do not know how many cases of the new form of CJD there will be, nor is the link with

eating beef proven, nor are the political consequences clear. All one can do is to analyse and reflect on the story so far.

Box 2



Peter Brookes cartoon
Source: *The Times*, 13th March 1997.

Chapter 1

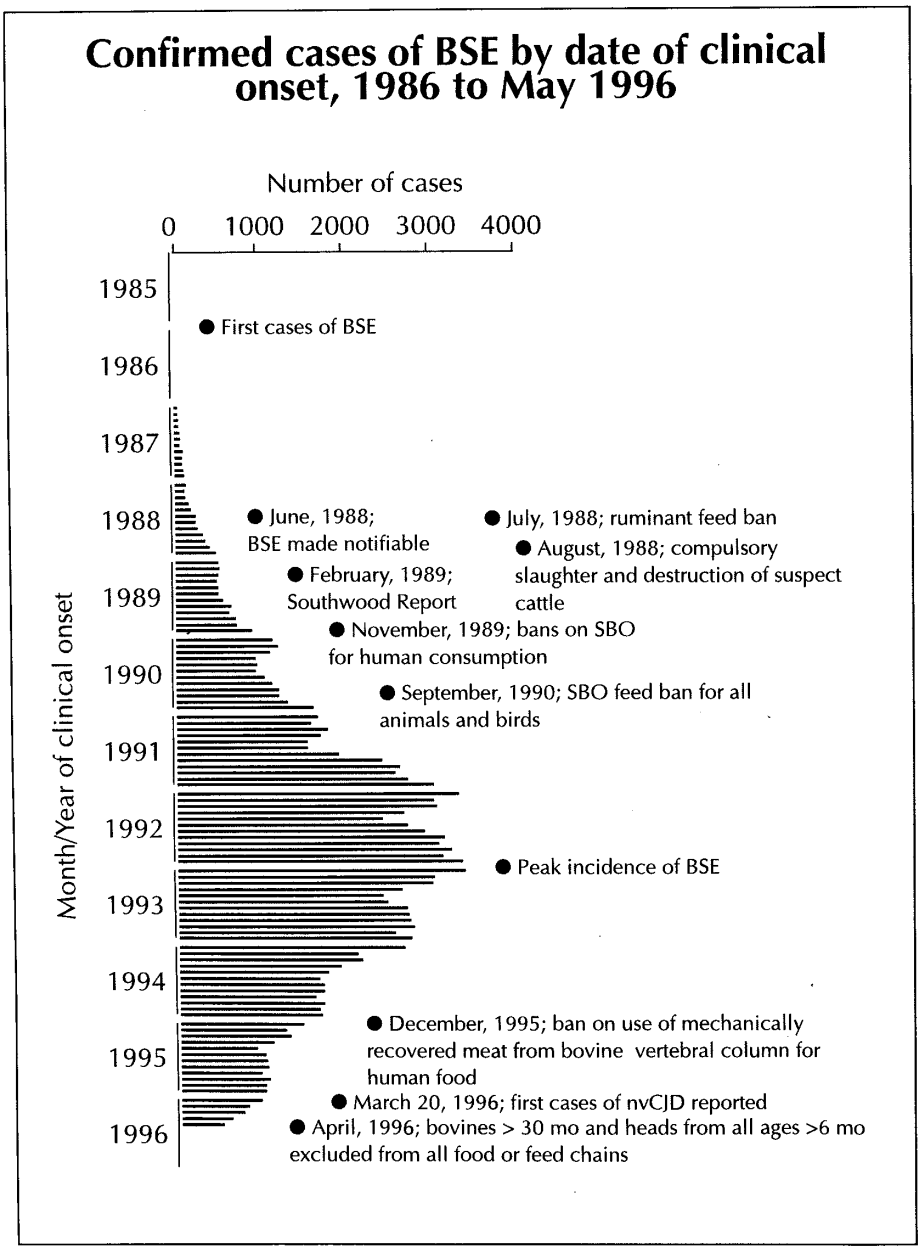
BSE

BSE was first identified in November 1986 by the Ministry of Agriculture, Fisheries and Food (MAFF) Central Veterinary Laboratory, Weybridge, although it may have occurred as early as April 1985.[1] In the next two years, to 31st December 1988, there were 2,160 confirmed cases in Great Britain, occurring on 1,667 farms. There may, of course, have been more; it is unlikely that all were identified. BSE was made a notifiable disease on 21st June 1988. The numbers of reported cases since then are shown in Box 3.

The symptoms of the disease involve the animal behaving in odd ways – walking or trotting oddly, pawing the ground, licking its nose, showing increased anxiety and fear. Kicking and general nervousness are also included in the signs, with difficulty in changing direction on a concrete surface, a tendency to slip and fall and (in the late stages) an inability to get up again. Following the onset of clinical signs, the animal's condition deteriorates over a period, typically of two weeks to six months, until it dies or becomes unmanageable and has to be destroyed. There is no effective treatment and no cure. Since the introduction of compulsory notification and slaughter, death has been much swifter. The Southwood Report, published in February 1989, recorded that the average time between notification and slaughter was eight days, with over 80 per cent killed within three weeks.[2] Certainty of diagnosis is currently only possible after death, following histological examination of brain tissue.

The incubation period for the disease is thought to be about five years, with considerable variation around the mean, but little variation between cohorts. The average age of infection is thought to be about one year.[3] Since most calves and cattle are slaughtered at younger ages than five years, many of those

Box 3



Source: J G Collee and R Bradley (1997) BSE: a decade on – part 1. *The Lancet*, vol. 349, p. 636.

infected would not have lived long enough to develop clinical symptoms. Not surprisingly, therefore, over 90 per cent of reported cases originate in dairy or mixed herds, where the average age of cattle is higher, rather than in beef herds. The difference may also be connected with different feeding patterns between dairy and beef herds. The incidence has been much higher in the south and south-east of the country than in the west and north. With a total cattle population in Great Britain of 13.6 million (and a similar number of calves) in 1974, dropping to 9.5 million in 1995, the recorded incidence of BSE is actually quite low, peaking at around 18 per thousand adult cattle per half year in 1992, and dropping sharply from mid-1993 onwards. The incidence was also low in any one herd – depending of course on the accuracy of reporting – with 70 per cent of affected herds having three cases of BSE or less since 1988.[4] Around one-third of British farms have had at least one case – one-half of all dairy farms, but only roughly 15 per cent of beef suckler herds.[5]

BSE has occurred in other countries, sometimes in indigenous cattle, more frequently in cattle imported from the UK. (See Box 4 for the number of cases reported by country up to 31st October 1996.) While there may have been some under-reporting, it seems unlikely that a major epidemic of BSE on anything like the scale that we have experienced will now occur anywhere outside the UK, provided that the lessons about meat and bone meal have been learned and acted upon.[6]

All the known facts about incidence point to contaminated feed as the most likely main source, and specifically to meat and bone meal (MBM). The latter contained protein derived from dead sheep and cows via abattoirs, butchers and rendering plants. The argument for MBM was one of assumed efficiency: it was using a cheap source of protein to increase agricultural productivity. The argument against is that it was tampering recklessly with the natural order. Ruminants are not meat-eaters, still less eaters of their own species: if man chooses to intervene, he had better be ultracautious, since the

Box 4

Number of cases of BSE by country to 31st October 1996

Country	Number
Great Britain	164,258
Northern Ireland	1,733
Isle of Man	408
Jersey	120
Guernsey	600
Alderney	2
Republic of Ireland	153
France	26
Portugal	58
Switzerland	228
Germany	4
Denmark	1
Italy	2
Canada	1
Oman	2
Falkland Islands	1

Outside the United Kingdom, BSE has been reported in home-bred animals in the Republic of Ireland, France, Portugal and Switzerland. All reported cases in other countries have occurred in animals which were born in the UK. With the exception of the UK and Swiss figures, all figures are those reported to the OIE and may be a little out of date.

Source: MAFF, *BSE in Great Britain: A Progress Report,* November 1996.

responsibility lies on his own head and cannot be blamed on natural disaster or Act of God.

Coincidence appears to have played its part in the disaster, in that the rendering process, for producing tallow and animal protein from animal carcasses, changed in many British plants in the early 1980s to one that subjected the material to lower temperatures and was less successful at eliminating infectivity. The Government has been blamed for failing to spot the dangers and for allowing this change in practice. With hindsight, that is correct. But the blame probably lies more with the pursuit of profit, without due regard for risk, than with deregulation as such (see Box 5).

Whether the infectivity came from sheep or from cattle is unclear. It may have come from sheep initially and then spread among cattle by recycling of the infection once it had jumped the species barrier. It now seems probable, following much more recent research,[7] that there is also some so-called vertical transmission of BSE from infected cows to their calves, although this is thought to be a minor factor in the total figures to date. There remains no evidence (under normal, as opposed to laboratory, conditions) of lateral transmission, from one calf or cow to another of similar age within the same herd. The disease does not appear to be infectious in that sense.

Simply taking the BSE part of the story, until March 1996, how well was the epidemic handled by the British Government in general, and by MAFF in particular?

The main events are summarised in Box 6, selected (and slightly amended) from a longer chronology submitted by MAFF to the House of Commons Select Committees of Agriculture and Health, sitting jointly on 27th March 1996[8] and continued from MAFF's November 1996 Progress Report. The chronology begins with the identification of the disease in November 1986. MAFF Ministers were informed by the Chief Veterinary Officer only in June 1987. By December of that year, MBM was thought definitely to be the cause. Only in March 1988 was the Chief Medical Officer informed and he

Mr Dorrell and Mr Hogg on changes in the rendering process

Mr Dorrell

Can I add something to that, Chairman? One of the lines that has been pursued by some commentators in the last few days is that the development of the BSE condition, traced as it is back to foodstuffs, can be attributed to deregulatory moves in the early 1980s. I do think it is very important to answer that charge directly. The position is that there was no deregulation of the foodstuffs industry that affects this case in the early 1980s. Miss Harman, in her contribution on this subject on the floor of the House, alleged that the out-going Labour Party had put in place, or planned to put in place, regulatory steps that would have prevented the development of this condition in animal foodstuffs. That is not true. We have been back through the relevant papers. The position is that a proposal was indeed under discussion at the time of the 1979 General Election. It was not directed at the control of BSE or any similar condition, because that was not known at the time to be a threat; it was actually directed at the control of Salmonella. So it was not directed at this problem, and nor would it have had the by-product of dealing with this problem because the terms of that regulation – had it been imposed and it was not imposed – would not have had the by-product of regulating the industry in such a way as to prevent the development of this disease. What happened during the 1970s and 1980s was a change in the processes of the rendering industry, driven by changing practices within the industry and, ironically, also driven by a desire to improve the safety standards of people working in the industry. It took place against a background of no known threat of this type of condition emerging.

Mr Hogg

Perhaps I might add, Chairman, that this particular issue, the causes of BSE, were analysed by Sir Richard Southwood in his report in February 1989. You will find the relevant parts on page 11, paragraph 4.2.8. I quote from part of that paragraph: 'The introduction of continuous rendering processes during the 1970s and the 1980s, which may have resulted in the rendering of

animal material at a lower temperature and/or for less time than previously, and the decline in the practice of using hydrocarbon salves for fat extraction since the mid-1970s...'. There was nothing here about deregulation. Indeed, the first regulation that was made relevant to protein was made in 1981. The Labour Party, which was the Government of the day, was concerned about Salmonella, which was a different proposition entirely.

Source: House of Commons Agriculture and Health Committees' Joint Report: *BSE and CJD: Recent Developments*, 1996, pp. 14–15.

briefed Health Ministers. As a result, in April, the Government announced the appointment of a Working Party, chaired by Sir Richard Southwood FRS, Professor of Zoology at Oxford, to examine the implications of BSE for animal health and any possible human health hazards, and to advise the Government on measures to be taken. The interim and final recommendations of the Southwood Committee were all published, accepted by Government and followed, thus establishing a partnership between science and politics, in the tradition of Plato's philosopher kings. It was as though Ministers were saying 'In this difficult area of policy, we will be guided by the scientists, and we will make their advice public.'

Their assumption seems to have been that consumer confidence would be achieved by having independent advisers and following their advice. One of the striking features of the whole story, however, is that the balance between the science-led and the politics-driven approaches has fluctuated wildly at different stages (see Box 7). Perhaps the crux is that science can only state the objective evidence. What to do about it is a matter of management and political judgement, not science.

While the Southwood Committee concluded its work in February 1989, reported and was laid down, an interim recommendation to set up an expert consultative committee on research had already been accepted by Government. It was set up under the Chairmanship of Dr Tyrrell, a well known virologist, who later chaired the Spongiform Encephalopathy

Box 6

Chronology of events

November 1986
BSE first identified by Central Veterinary Laboratory.

5th June 1987
Chief Veterinary Officer (CVO) informs Minister of Agriculture about new disease.

15th December 1987
Initial epidemiological studies completed, which concluded that ruminant-derived meat and bone meal (MBM) was the only viable hypothesis for the cause of BSE.

3rd March 1988
Department of Health informed. Expert Advisory Committee recommended.

21st April 1988
Southwood Working Party established. As a result, Government indicated it would legislate to make BSE notifiable and to ban ruminant-derived MBM.

21st June 1988
BSE Order 1988 made BSE notifiable.

July 1988
Following advice from Southwood, decision announced to introduce slaughter of affected cattle, and ban on ruminant-derived MBM comes into force.

8th August 1988
Compensation Order introduced. Compensation set at 50 per cent of value for confirmed cases, 100 per cent for negative; both subject to a ceiling.

February 1989
Southwood Report received and published, with Government's response. Establishment of Tyrrell Committee on research announced (as recommended by Southwood).

10th June 1989
Tyrrell Report received by Government.

13th June 1989
Decision to introduce offals ban announced – not a Southwood recommendation but a Government initiative.

28th July 1989
EC ban on export of cattle born before 18th July 1988 and offspring of affected or suspect arrivals.

13th November 1989
Ban on specified bovine offals (SBO) came into force.

9th January 1990
Tyrrell Report on research and Government response to it published.

14th February 1990
Compensation figures changed (see 8th August 1988). Full compensation would be paid, up to a ceiling.

1st March 1990
EC restricts exports of cattle to animals under six months.

1st April 1990
Disease made notifiable to European Commission.

3rd April 1990
SEAC established under chairmanship of Dr David Tyrrell.

9th April 1990
EC decision to ban export of SBO and other tissues.

11th April 1990
Humberside CC withdraws British beef from school meals.

24th July 1990
Dr Tyrrell writes publicly to the CMO to say 'any risk as a result of eating beef or beef products is minute. Thus we believe there is no scientific reason for not eating British beef and that it can be eaten by everyone.'

25th September 1990
Ban on the use of SBO extended to its inclusion in any animal feed. Export of such feed to other EU Member States also banned. (Exports outside the EU banned 10th July 1991.)

15th October 1990
Farmers required to maintain breeding and movement records.

27th June 1994
Prohibition on the feeding of mammalian protein to ruminants throughout the EU, other than Denmark.

1st April 1995
Compulsory blue staining of SBO.

15th August 1995
The Specified Bovine Offal Order 1995 consolidated and tightened the existing rules for processing SBO.

Autumn 1995
Spot checks disclose widespread failures to comply with regulations in the handling of SBO in abattoirs (48 per cent) and knackeries and hunt kennels (65 per cent).

28th November 1995
Acting on advice from SEAC, Government announced its decision to stop the use of bovine vertebral column in the manufacture of mechanically recovered meat.

20th March 1996
Government announces ten cases of new-style CJD, and their possible link with BSE. Further control measures introduced. Cattle over 30 months must be deboned and trimmings kept out of the food chain.

27th March 1996
EU ban on all UK beef exports, whether to Member States or to other countries.

28th March 1996
Government announces calf slaughter scheme and financial aid for the rendering industry.

3rd April 1996
Introduction of 30-month slaughter scheme to ensure that all cattle over 30 months at the time of slaughter do not enter the human or animal food chains.

21st/22nd June 1996
Florence Summit of the European Council agrees framework of actions required by the UK prior to any lifting of the export ban.

29th August 1996
Professor Anderson of Oxford and his team in collaboration with Wilesmith and others at the Central Veterinary Laboratory publish their analysis of the BSE epidemic in *Nature*, vol. 382, predicting that the epidemic will virtually die out around 2001 irrespective of further measures.

Source: MAFF in House of Commons Agriculture and Health Committees' Joint Report: *BSE and CJD: Recent Developments*, 1996, and *BSE in Great Britain: a Progress Report*, November 1996.

Advisory Committee (SEAC), until succeeded by Professor John Pattison. SEAC has a remit that includes not only advice on research, but also monitoring events relating to these diseases and their implications for animal and human health. Included in the membership from the beginning was Dr R J (Bob) Will, a consultant neurologist, who is head of the National CJD Surveillance Unit and is thus in the key position to know what is happening in the incidence of CJD in the United Kingdom.

On the credit side, in drawing up a balance sheet over the handling of BSE, is the attention given to scientific evidence and advice, from the setting up of the Southwood Committee onwards – at least until the recent heady days of political manoeuvring on the European stage, where (as we shall see) the science seems to have been left far behind. The conclusion of the Southwood Committee that it was 'most unlikely that BSE will have any implications for human health' (para 9.2)[9] now looks to have been wrong. Nevertheless, it was a reasonable conclusion at the time and was combined with the following recommendations: a condemnation of the use of MBM; an exhortation to farmers 'to exercise continual vigilance to ensure that animals exhibiting early symptoms are identified and prevented from entering the human food chain'; an emphasis to everyone on the seriousness of the implications if the Committee proved to be wrong about transmission to humans; and a boost to research.

But not all the entries are on the credit side. Why was the Department of Health not informed until nine months after the Minister of Agriculture? Was it good enough that having concluded in December 1987 that MBM was the 'only viable hypothesis for BSE' the ban was not in place until seven months later? A substantial number of animals must have been infected during this period. Even then, why was the issue of unused stocks of MBM not addressed? Should MAFF not have realised the near certainty that these stocks would continue to be fed to cattle somewhere? Since MBM was still available for

pigs and chickens, what about the danger that it would continue to be fed to cattle by some farmers? Why was the ban on specified bovine offal (SBO) not in place until November 1989? Why was the compensation initially set at only 50 per cent for confirmed cases, providing an incentive to deny them? Why was the research programme, recommended by Southwood, so slow to start and on such a meagre scale in the early days? Like other Ministries, MAFF has a responsibility both to nurture the industries for which it is responsible and to regulate them. In this instance did not the nurturing – and the supposed economic inevitability of intensive methods in farming – take undue precedence over protecting the consumer? The Ministry is responsible for the safety of food and there was a chance that lethal food was entering the food chain. The risk may have been small, but it was, after all, a risk of death. As Dr Stephen Dealler put it in a memorandum to the House of Commons Agriculture and Health Select Committees, meeting jointly on 17th April 1996, 'The sheer will of both the MAFF and the trade that BSE would go away must have had an effect'.[10] At times the effect seemed to be to slow the Ministry down and discourage it from any action that would put the short-term interests of agriculture and associated industries at risk. The wish not to overreact, thereby damaging these industries, could at times paralyse any action at all.

It is, of course, one thing to decide the policy and another to see that it is carried out. Here again, MAFF seems to have been unduly trusting, for example towards the slaughterhouses. When unannounced visits were made to them in late 1995, about half were found to be failing in the handling of specified bovine offal,[11] so that banned material was entering the human food chain. Granted the nature of abattoirs – which are not nice places to work, nor easy to manage – and the optimistic nature of the regulations around total elimination of the spinal cord from all meat, including mechanically recovered meat (MRM, which results from putting bones through a machine to recover the soft tissue from them), would it not have been

Box 7

Parliament on science and politics

(Joint meetings of Agriculture and Health Select Committees March to May 1996)

Sir Jerry Wiggin MP, Chairman
'I do appreciate the problem the scientists have – ... I appreciate you can never say "never".'

Mr Bayley MP
'Government ministers in the last week have been at pains to point out that your policy decisions are based on sound science ... (but) there is a widespread fear ... that the government is listening to the science it wants to listen to and not listening to other opinion... Would it not help to restore public confidence if some people who have taken a more cautious line than the Government has taken – a more precautionary line, perhaps I should say, than the Government has taken – were added to the membership of SEAC to reassure people that the widest range of sound and well-informed scientific evidence is being listened to?'

Dr Kimberlin
'If you can remember back to the 1988/89 period, we had no predictions about what kind of epidemic BSE would grow into. Nevertheless ... something had to be done and done reasonably quickly. As far as I am concerned, that was done reasonably quickly and reasonably well.'

Dr Stephen Dealler in a written memorandum
'Specific assumptions taken initially by the Southwood and Tyrrell Committees were reasonable but were unacceptable in public health terms.'

(House of Commons, 17th February 1997)
Mr David Heathcoat-Amery MP
'... the laudable aim of making science our guide overlooked the fact that scientific opinion on issues was shifting. We still do not know the precise connection between the animal and human forms of the disease, and we may only estimate the real risks to humans.'

Mr Colin Pickhall MP
'The Minister has repeated over and over again that he is

following the science ... He does not tell us that the Ministry chooses which science to follow.'

Mr Martyn Jones MP
'Mr Hogg's only method for solving the beef mess has been to recruit Old Father Time and take the best scientific advice – where the definition of "best" is what is best for the Government at the time.'

Sources: House of Commons Agriculture and Health Committees' Joint Report: *BSE and CJD: Recent Developments,* 1996, and House of Commons *Hansard* for 17th February 1997.

prudent to expect in advance a degree of non-compliance? No doubt MAFF was under many conflicting pressures and did not want to overreact. But it did not act with either the urgency or the operational effectiveness appropriate to a potential crisis of this magnitude.

A debit entry of a different kind is about political correctness within science. The Government deserves credit for setting up the Southwood Committee when it did. That Committee reported to the highest standards on the evidence then available, and called for further research – a call to which the Government responded. Nevertheless, there was a powerful scientific orthodoxy at the time – for example that BSE did not constitute a threat to human health – which also suited the political orthodoxy. Those scientists who took a more gloomy view tended not to receive much of a hearing, nor to receive research grants. Some of them, it is no doubt true, did not deserve serious attention. But others did. The same trait of not wanting to listen to the possibility of unwelcome news is apparent in the 1996 Select Committee hearings. People like Dr Stephen Dealler and Professor Tim Lang were treated with scant respect[12] and yet they may prove to have been right.

Something that we may need to learn is that, when it comes to research, the research studies most worth doing may be those that challenge the current orthodoxy, provided that they are soundly conceived and conducted. A study that

supports current policy assumptions can of course have value. One that challenges them can be even more valuable, if it turns out to have been correct. An interesting illustration of a thesis that may, or may not, prove to have substance is Mark Purdey's theory about organophosphates. Michael Meacher, former Labour spokesman on environmental protection, thinks that it will. Sir Aaron Klug, President of the Royal Society, thinks not (see Box 8).

Because the remote chance that BSE might turn out to be a danger to human health was of such grave importance, it deserved a far more serious hearing than it received in either scientific or Government circles. Within MAFF, the vets seemed more powerful than other scientists and they were preoccupied with animal health and husbandry, not basic science or risks to human health. Perhaps that is why the research programme was sluggish and relatively feeble. Had it moved faster and more radically, we would now know more than we do about the science of these diseases.

As a senior civil servant in MAFF put it privately, before disaster struck in 1996, 'We are skating on very thin ice', meaning that the BSE epidemic might at any time lead to a ban on British beef. Whether or not he realised it, the ice was even thinner, in the sense of what is now perceived to have been a substantial danger to human health. Another three years and the danger of an epidemic would have passed. Government would have 'got away' with it. Almost, but not quite. The skating analogy is apposite: if the ice is thin, skating on it may well be forbidden, in order to avoid the risk of tragedy.

Box 8

The Daily Telegraph 29th January, 1997

Let's find the real cause of BSE

Michael Meacher, labour spokesman on environmental protection, promises to tackle the use of insecticides on cattle

A number of awkward facts do not fit the official theory. However, they do fit another theory which is steadily gaining ground – and has been advanced by Mark Purdey, an organic farmer from Somerset with a background in molecular biology.

He believes, and has amassed a mountain of evidence to support his charge, that the real culprit is the use of organophosphates (OPs) to eradicate the warble fly in cattle. OPs were first used as nerve gas poisons before being turned against insects, and since the early 1980s, the Ministry of Agriculture, Fisheries and Food has forced all farmers to use them. One OP in particular, Phosmet, which has been very widely used since 1985, also contains Thalimide, the basic unit of the infamous thalidomide.

Phosmet is poured on the back of the animal and penetrates the skin, brain, central nervous system and placenta. It is believed that it enters the brain of the foetus in utero, damages the foetal brain stem, which is developing rapidly at this time, and disrupts the production of a key protein there which becomes abnormally folded. A build-up of deformed protein plaques cause nerve damage. This in turn triggers the release of nerve growth factor, which accelerates production of the abnormal protein. As this vicious circle develops, symptoms of BSE appear.

The Government is reluctant to undertake the necessary research.

A new government should sweep aside these evasions. The Purdey theory should now be taken very seriously by the authorities. It is high time that a full-scale research programme was instituted into the role that OPs may play, not only in BSE/CJD, but in the contribution they may make in the development of diseases such as ME, MS, Alzheimer's, Parkinson's, depression and heart disease

The Daily Telegraph 10th April, 1997

Don't let a story get in the way of BSE facts

Sir Aaron Klug, Royal Society President, says scientists and the media should talk the same language

One issue has dominated my mailbag at the Royal Society for the past year: BSE, or mad cow disease, as journalists like to call it. That is understandable, given that the disease plunged our food industry and politics into crisis.

I am heartened by how, over the years, science and its place in society is being more widely discussed. This is largely due to the media, which should be congratulated. But when it comes to the science of BSE, the outcome has been unpredictable.

Many of the letters I receive – from peers, from farmers, from the public – raise a theory linking BSE to the use of organophosphorus pesticides.

It is a theory the media return to again and again, promoting the romantic image of the lone advocate of this idea pitched against the might of the science establishment, which rejects heterodox views.

But the media have consistently failed to make some basic facts clear. Commentators are quick to point out that the organophosphorus compounds used are related to nerve gases such as sarin, which belongs to the same class of chemicals.

The media point out that sarin and organophosphorus pesticides attack the same key enzyme, acetylcholinesterase, which is needed to destroy a chemical messenger, acetylcholine, after it has done its job of transmitting a signal across a nervous junction.

However, different organophosphorus compounds produce different effects, depending on the route of absorption in the body, and the diverse locations of nerve junctions using acetylcholine increase the complexity of the response.

The fact is, however, that they do attack the nervous system, and one of the symptoms is unsteadiness on the feet. But the damage caused by these pesticides is unlike that caused by BSE, or indeed the new variant of CJD. The neuropathology is different: victims of pesticide poisoning do not have the microscopic holes in the brain that characterise spongiform diseases.

So, why has no one from the media asked for my comments? Would facts spoil the story of scientists in the dark?

Chapter 2

The science of the encephalopathies

BSE belongs to the group of diseases known as transmissible spongiform encephalopathies (TSEs). These occur in other species, particularly sheep, where scrapie has been known since the early part of the 18th century and has been widely distributed geographically. They occur in man in the form of Kuru, which was identified among tribes practising cannibalism in Papua New Guinea, in Creutzfeldt–Jakob disease (CJD) and in Gerstmann–Straussler syndrome. 'Spongiform' describes the groups of holes that are seen (after death) in the brain tissues of animals and humans that have contracted these diseases and 'encephalopathy' is the term given to a disturbance of brain function. Symptoms in the TSEs include deterioration of mobility and mental alertness, leading to death.

Until two or three years ago there was no scientific consensus on the origin and disease process of the TSEs. The Southwood Report, for example, taking a carefully balanced view of the evidence available in 1989, acknowledged three hypotheses about the nature of the infective agent: one viral, one that it is a virino (containing a core of non-translated nucleic acid associated with cellular proteins) and a third arising from a protein abnormality.[13] It is the last of these that now looks more and more convincing. What is surprising (and helps to explain some of the reluctance to accept the idea) is that this is an entirely novel concept of a disease process: that a protein should behave like a virus.

One of the unique features of the TSEs is the presence in the brain tissue (and sometimes in the spleen and lymph nodes) of an abnormal protease-resistant protein, commonly called a prion or PrP^{Sc}. The normal protein (PrP) is very widely distributed in mammal tissues, including the brain, although quite what it does is unclear. It probably has something to do

with how cells communicate to one another, and its malfunctioning may prove to be important in our understanding of brain disease. The difference between the normal protein (PrP) and the abnormal (PrP^{Sc}) does not lie in its chemical composition, but in its shape, the way that it is folded. Somehow the malfolded prion behaves as though it can replicate itself, by capturing and converting PrP into PrP^{Sc}. Only a very small amount of contaminated material appears to be required initially, which then precipitates a cascade effect. Whatever the nature of the original agent, it is hard to destroy by any of the methods by which viruses are eliminated – hence explaining, for example, why a lowering of the temperature in the rendering process for converting carcasses into tallow and MBM may have been so damaging.

The effect of the changes that are triggered by the prion is damage to the neurons or nerve cells, leading to the characteristic sponge-like appearance of the affected brain. The process of degeneration is slow but appears, once started, to be irreversible and ultimately deadly.

The initial infection seems (unlike many other infections) to be relatively non-contagious among those exposed to it. Predisposing factors include concentration of the infective agent, age and genetic predisposition. The genetics of the TSEs are currently the subject of intensive scrutiny and our knowledge is increasing fast. The relative importance of the genetic factor appears to vary from one disease to another. In BSE (at least at the high rates we have experienced) genetic susceptibility seems to play a relatively minor role. The opposite is the case in familial CJD (responsible for some 14 per cent of all CJD) and in Gerstmann–Straussler syndrome (GSS). Although these diseases may be hereditary, the more common pattern is likely to be that genetic predisposition is a contributory factor. Normal genetic variation in the structure of the PrP module suggests that some individuals have an innate predisposition to abnormal folding of the molecule, leading to the PrP^{Sc} shape.

Contagion – meaning 'horizontal' transmission from one animal or human to another through contact or proximity, as in measles or flu – almost certainly does not occur. Whether 'vertical' transmission occurs, from mother or father to offspring, is uncertain; recent evidence suggests that it does happen, but at a low rate. How it passes from parent to offspring, for example through the placental wall within the womb, is unclear.

CJD is the main TSE of man. It occurs sporadically, virtually throughout the world, at a rate of about one case per two million people each year. When it happens – and it is on these numbers a rare disease – it is likely to be to someone aged between 50 and 70. For sporadic CJD, there is no evidence of transmission through infection. However, we know that iatrogenic CJD (meaning CJD resulting from medical intervention) can be transmitted. The commonest of these tragic cases is through the injection of growth hormone derived from human cadaveric pituitary – at one time an accepted treatment for children whose physical development was severely retarded. Treatment by this method has now been suspended – growth hormone from this source was withdrawn from the market in 1985 – but CJD deaths from this cause are still happening because of the long incubation period characteristic of the TSEs. Other examples of the transmission of CJD are known from implanted brain electrodes, corneal grafts, dura mater grafts, human pituitary-derived gonadotrophin and the use of infected neurosurgical instruments.[14] Iatrogenic – as opposed to sporadic – CJD can develop in a much younger age group and shows distinctively different patterns in the brain tissue, on histological examination after death.

Of the human TSEs, Kuru not only raises a macabre frisson: it is also instructive in the context of recent events. The disease was first reported in 1957 and was confined to an area in the eastern highlands of Papua New Guinea. The symptoms were quite similar to those of BSE in cattle, namely shivering,

loss of control and balance, mood and behaviour changes, followed in the end by death.

The cause was shown to be ritualistic cannibalism. The tribe concerned ate their relatives on death as a mark of respect. So transmission was by eating infected material. The disease occurred mainly in women and children, not in men. The probable explanation is that men ate the prime cuts, while the women and children were left with the offal, the brains and the less desirable parts. This echoes one of the things that we now think we know about beef infected with BSE: that the infectious agent is concentrated in the brain and spinal cord.

The main reason why most scientists took the view that the risk of human infection from BSE was very low was that the TSEs are in general subject to a species barrier. They are in any case not easily transmitted from one individual to another, and transmission to an individual of a different species is much rarer still. Scrapie, for example, is the commonest of all the TSEs and appears to arise sporadically and naturally in sheep. It does not easily cross into other species, although it can be transmitted experimentally to goats, and to mice and hamsters.

In recent years there has been intense experimentation with transmission, including transmission across the species barrier, in order to seek to understand how it takes place. In general the results emphasise that jumping the species barrier is difficult, although for many TSEs it can be done. It is, for example, very hard, but not impossible, to give a mouse human CJD. Once infected, the infected animal has mouse CJD. Transgenic mice have been bred for experimental purposes, with some of the genetic characteristics of, for example, cattle or humans. One would expect such transgenic mice to be more easily infected by (in the first instance) BSE or (in the second instance) CJD, because of the reduction or removal of the species barrier.

Boxes 9 and 10, derived from SEAC's report on the TSEs,[15] summarise the distribution of the TSEs among species and geographically. All except scrapie and BSE are rare. A number

Box 9

Naturally occurring Transmissible Spongiform Encephalopathies (TSEs) reported before 1985

Host	Disease	Source	Reported distribution
Man	Kuru		Papua New Guinea (declining to rarity)
	Creutzfeldt–Jakob disease (CJD)	Sporadic c.85%	Worldwide
		Familial c.<15%	(rare)
		Iatrogenic c.1%	
	Gerstmann–Straussler (–Scheinker) syndrome (GSS)	Familial	Worldwide (extremely rare)
Sheep, Goats	Scrapie		Sheep scrapie (widely distributed but not reported in Australia, New Zealand and some countries of South America and Europe)
Mule deer, Elk	Chronic wasting disease (CWD)		North America (localised)
Farmed mink	Transmissible mink encephalopathy (TME)		North America, Mainland Europe (rare)

Source: SEAC, *Transmissible Spongiform Encephalopathies: a Summary of Present Knowledge and Research*, 1994, p. 11.

Naturally occurring TSEs reported from 1985 onwards. Other than BSE, all TSEs shown are rare

Host	Disease	First report	Reported distribution
Nyala	SE	1987	England
Cattle	BSE	1987	UK, Republic of Ireland (RoI), Oman, Falkland Islands, Switzerland, France, Denmark, Portugal, Canada, Germany
Gemsbok ○	SE	1988	England
Arabian oryx ○	SE	1989	England
Great kudu	SE	1989	England
Eland ○	SE	1989	England
Cat	FSE	1990	British Isles
Moufflon ○	Scrapie	1992	England
Puma ○	FSE	1992	England
Cheetah ○	FSE	1992	Australia*, GB, RoI*
Scimitar-horned oryx ○	SE	1993	England

○ *Transmission not attempted.*
* *Cheetah presumably exposed in Great Britain.*

Source: SEAC, *Transmissible Spongiform Encephalopathies: a Summary of Present Knowledge and Research*, 1994, p. 12.

of them have been identified only within the last ten years and most of these have not been reported outside England. The likelihood is that, as with BSE, the TSEs in species like kudu

(which are a type of deer) have their origin in infected feed, and specifically meat and bone meal (MBM), containing protein derived from dead animals. What is clear is that by the early 1990s, there was in England a major epidemic of BSE, almost certainly man-made in the sense that it derived from the use of MBM. The implications were alarming. It was bound to take many years to eradicate because of the characteristically long incubation period of the TSEs. The main cause of transmission in cattle had already been removed with the banning of ruminant-derived feed in July 1988, some four years before the peak of the epidemic (Box 3). New cases would nevertheless arise until about the end of this century, even if the ban was effective.

The prevailing scientific view was that, unpleasant and inconvenient as BSE was, it did not constitute a danger to human health. This was the view of the Working Party chaired by Sir Richard Southwood, which nevertheless acknowledged that 'because the possibility that BSE could be transmitted orally cannot be entirely ruled out, known affected cattle should not enter the human food chain'.[16] Accordingly, it recommended that animals suspected of having BSE should be destroyed, as should milk derived from them. It considered, but at that time rejected, the notion of labelling all products containing cattle-derived brain and spleen 'to enable the consumer to make an informed choice'.[16] Subsequently (in November 1989 in England and Wales and slightly later in Scotland and Northern Ireland) such products were banned for human consumption, under the Bovine Offal Prohibition Order.

The Southwood Report concluded: 'From present evidence, it is likely that cattle will prove to be a "dead-end host" for the disease agent and most unlikely that BSE will have any implications for human health. Nevertheless if our assessments of these likelihoods are incorrect, the implications would be extremely serious'.[17] That remained a fair and balanced statement of the evidence until the spring of 1996. What it did

not – and could not – do was to determine how to weight the small, but potentially lethal, risk to which the Southwood Committee pointed. Nor could it decide what to do about it, because that is a social/political question, rather than a scientific one.

Note that the Southwood statement is one of probabilities, not certainties, with an acknowledgement of a small, but potentially very damaging, risk. Probabilities, uncertainty, risk and costs are aspects of science not dealt with in this chapter, but ones to which we will need to return after recounting what happened in 1996 to alter the balance of the evidence on BSE and human health.

Chapter 3

Crisis

On Wednesday 20th March 1996, at 3.30 pm, Stephen Dorrell, Secretary of State for Health, announced in a short statement to the House of Commons that there might, after all, be a link between BSE and CJD. What appeared to be a distinctively new variant of CJD, occurring in a younger age group, might stem from this source. A statement followed by Douglas Hogg, the Minister for Agriculture. Both Ministers sought to reassure people: Mr Dorrell by setting aside £4.5 million for further research; Mr Hogg by announcing tighter controls on meat processing and a total ban on feeding meat and bone meal (MBM) to all farm animals. The new controls along with those already in force meant, Mr Hogg said, that 'British beef can be eaten with confidence'. Not surprisingly, not everybody was so sure and cattle prices began to fall at once. Beef consumption fell abruptly, not only in the UK but also in continental Europe. By mid-April, according to the Irish Food Board, consumption was down by 45 per cent in Germany, 40 per cent in France, 36 per cent in the UK and 30 per cent in Spain and Italy.[18] France first, and then half a dozen other European Union countries, imposed unilateral bans on British beef, to be followed on 27th March by a total European Union ban on all UK beef exports anywhere in the world.[19]

The Ministerial statements of 20th March were precipitated by what may have been a leak or may have been an investigative scoop. Either way the *Daily Mirror* was the vehicle. It forced the Cabinet into going public earlier than it might have wished. While revealing the bad news, the Government appeared to have little by way of a credible strategy for responding to it. Rather, Ministers seemed to be locking the stable door. Strategies were aired, ranging from doing almost nothing to slaughtering the entire British cattle

population, without any convincing statement of the Government's chosen response: a recipe, with hindsight, for maximum public alarm and minimum leadership.

The scientific evidence about the ten new CJD cases in the UK was not published until 6th April in *The Lancet*.[20] The information contained in that article had first come to the attention of SEAC on 5th March. Dr Bob Will, who was the first-named author of the *Lancet* article and head of the CJD Surveillance Unit in Edinburgh, was also a member of SEAC. The Chief Medical Officer was informed on 8th March; the Secretary of State and Douglas Hogg a few days later. By 17th March the Prime Minister was aware and meetings between scientists and Ministers followed on a daily basis, leading to a grilling by the Cabinet on 21st March or thereabouts. What Dr Will and his colleagues believed that they were observing was a new variant of CJD, at that stage not recorded in any other country. A distinguishing characteristic was PrP plaque extensively distributed in the brain, in a way not characteristic of traditional CJD, yet reminiscent of Kuru. Worryingly, the average age of death was substantially younger than for traditional CJD, ranging (for the eight who had so far died) from 19 years to 41, with a median of 29. Although there was no direct evidence of a link with BSE, the fact that this strain appeared to be a UK phenomenon was compatible with such a link, and the consistency of the neuropathological profile ('so consistent that neuropathological samples from the cases are virtually indistinguishable')[21] suggested that all these cases might stem from a single cause. The date of onset of the disease, commencing in 1994, would also fit with the timing of the BSE epidemic, which was first confirmed in late 1986. An incubation period of eight years would be perfectly credible in the light of what we know about other spongiform encephalopathies, including Kuru. None of this amounts to anything like certainty, as Mr Dorrell emphasised, but it is eerily reminiscent of one comment in the Southwood Report of 1989: 'It is a reasonable assumption that were BSE to be

transmitted to humans, the clinical disorder would closely resemble CJD. Depending on the route of transmission the incubation period could be as little as a year (as with some iatrogenic CJD cases) or several decades (as estimated for many natural CJD cases). Identification of any such cases would not be easy'.[22] As one senior scientist put it to me in private discussion in August 1996, on a scale of 0 to 10 he was then at about 7.5 certainty that the new variant of CJD would prove to be BSE-linked.

First reactions in the British media to the Ministerial statements of 20th March appeared to vindicate the line that Stephen Dorrell advised to Cabinet colleagues: tell the public the unvarnished truth and follow the advice of the scientists. On 21st March, editorials in *The Times*, *The Guardian* and *The Independent* raised the right issues and showed no signs of panic (Box 11). But the farmers were nervous, and rightly so. It was all very well for Mr Hogg to assure people about British beef. He would say that, wouldn't he? The picture of John Gummer, when Minister for Agriculture, feeding a beefburger to his daughter Cordelia went to undermine Douglas Hogg's case if one took the view (as many did) that John Gummer ought to have known better than to use his daughter, who was not in any position to make up her own mind. After all, Professor Pattison, the Government's key advisor as Chairman of SEAC, went on record not only to say that the risks of eating British beef now were very small, but also to add that his daughter and son-in-law were reserving judgement about whether and when to feed beef to their three-month-old child.[23] 'If you are asking me if the risk of eating beef is zero, I can't do that'.[24] Precisely so. It is the difference between probabilities and certainties. Moreover while Jeffrey Almond, another member of SEAC, put the risk of eating meat on a par with crossing the road,[23] the public is perfectly entitled to differentiate between risks that we cannot avoid and risks we do not have to take. Sooner or later most of us have to cross the road. We do not have to eat beef, still less British beef. Farmers and those involved in

Box 11

The Guardian 21st March, 1996

Bitter price of short cuts

We are all guilty about beef: farmers most of all

The biggest threat which mad cow poses is not to people who eat beef now — although scientists remain divided — but to people who ate infected beef products before the 1989 controls were introduced. We still do not know whether mad cow disease (bovine spongiform encephalopathy or BSE) can be transmitted to man but a worrying new form of Creutzfeldt-Jakob Disease (CJD), which could be linked with BSE was disclosed by ministers yesterday. New research into 10 people who died from CJD by a committee of specialists advising ministers concluded that "the most likely explanation at present is that these cases are linked to exposure to BSE before the introduction of the specified bovine offal ban in 1989."

Animal husbandry is expensive: it takes 7lbs of vegetables to make 1lb of beef protein. But the price of short cuts could not have been better illustrated. Cows are herbivores but have been fed chicken litter, pig offal and, until July, 1988, infected sheep remains. Yesterday's ban on all meat and bonemeal feed for animals comes far too late. The entire food chain philosophy is wrong: the search for a quick fix. Not all fault can be placed on the farmer — producers, processors, distributors, retailers, consumers are all involved — but it starts behind the farm gate. Farming became far too intensive: and nature has hit back.

The Daily Telegraph
21st March, 1996

How to react

But the damage, if that is what it proves to be, has already been done. BSE was first officially diagnosed in 1986, but only later did the Government take steps to ban suspect cattle feed and ensure that offal with which BSE might be associated did not enter the human food chain. After the further measures announced yesterday, for the de-boning of beef and a ban on all mammal meat and bonemeal in animal food, the risk from eating beef should, on all the evidence available so far. be minimal.

Yesterday some commentators and experts criticised the Government for not acting sooner. Some even went so far as to accuse it of failing to take proper precautions in order to avoid upsetting farming interests — traditionally a pillar of Tory support.

But no one has produced convincing evidence to support the accusation of bad faith. Ministers received tidings of the latest research only last week. Before that, there is no reason to suppose that they were guided by anything other than the best available medical and scientific advice, as they continued to be in their statements yesterday.

Whether the same can be said of the meat industry. in all its various manifestations, seems more doubtful. Modern farming has made food cheap and plentiful. But farmers have been reluctant to acknowledge the environmental and scientific side effects of some of their methods — including the connection between animal offal and mad cow disease. That cattle should be fed on other cattle always seemed an offence against taste. Now it is clear that it was an offence against nature as well.

The Independent
21st March, 1996

Carving up the consumer

The Cabinet must start to behave like a modern government. This does not mean ignoring the uncertainties of the science or ignoring the consequences for jobs in the food industry. But it must mean governing in the common interest. For too long this government, and the Ministry of Agriculture in particular, has been ruling in the interests of beef producers when the interests of consumers should have been paramount. Consumers need to rely upon government regulation to make sure food is safe. The case is becoming insurmountable for a system of consumer regulation of food safety separate from the Ministry of Agriculture. This fiasco will cast a shadow over the Government's entire approach to food safety. If it can get it this wrong on beef, how many other food safety problems is it willing to downplay for the sake of the food producers?

The public does not need only reassurance: it also needs clarity and honesty. There is hardly a department of government that should not be thinking about contingencies, for everything from international trade to alternative use for land now used for beef production.

The beef industry will be most damaged by yesterday's announcements, but just as damaged will be confidence in a system of government that has again been exposed as arrogant and complacent.

TIMES PAST — THE TIMES — FUTURE

The Times
21st March, 1996

BOVINE ALARM

British beef eaters face an uncertain future

The announcement by Stephen Dorrell of new evidence suggesting a link between bovine spongiform encephalopathy, "mad cow" disease, and its equivalent in humans, Creutzfeldt-Jakob disease, is alarming.

The Government has certainly acted honourably in placing these latest findings before the House and admitting that there is cause for concern.

The most difficult balance of all is between fostering complacency and inducing panic. With Aids, the Government has generally struck the right note; with BSE the record is more dismal. Each fresh statement seems to undercut the preceding one. With every attempt to lay out the latest scientific advice and prudent counsel the Government appears to retreat from lofty certainty and make its earlier stance look like culpable insouciance.

The result, predictably, is cynicism and confusion. This latest statement will fuel consumer alarm.

Whether this will cause the Government political damage depends on two questions. How much was the initial attempt to reassure the nation dictated by pressure from Britain's farmers? And how rigorous was the Government in enforcing preventative measures suited to a worst case scenario?

Ministerial resolution suggests that, short of eliminating Britain's beef herds, as much is being done as possible to combat BSE. The worry is that with such long incubation periods, it will be years before any increase in CJD infection due to BSE is known. The figures so far are very small but the trend is portentous. Britain may face a wave of cases contracted in childhood that only become apparent years from now.

the meat market who took the view that the Government was to blame, were whistling in the wind. Jim Watson, Banbury cattle market manager, might say that British beef remained '100 per cent safe' and 'The Government should concentrate on big killers like cancer and heart disease'. Rachel Fyfe, a farmer, might add 'The Government are just covering their backsides, but they know that the research is also tenuous. Until it is ever proved beyond doubt, they should not scare people like this; after all there is a risk in everything we eat'.[25] Such comments might accurately reflect farming opinion, but not public opinion more generally, still less markets. Panic was not far away, in Germany and France even more than here.

Stephen Dorrell, whose handling of the politics of the crisis was generally shrewd throughout, made a rare misjudgement in blaming the public for overreacting, when he said in *Call Nick Ross* on Radio 4 on 26th March that it was not the cows but the people that were mad.[26] This was an arrogant statement that may return to haunt him.

Meanwhile Paul Preston, Chief Executive of McDonald's UK, had followed an entirely different line from Stephen Dorrell by taking beefburgers temporarily off the menu in all the company's UK outlets. Mad or not, the public were Mr Preston's customers and he knew better than to ignore the evidence of plummeting sales. When beefburgers returned to the menu a few days later, they would be made with Dutch beef. McDonald's had seized the initiative, in a way reminiscent of Perrier's reaction to pollution of its supplies.[27] Competitors like Burger King, Wimpy and Wendy's followed suit. Mr Preston would no doubt say he had no choice, whatever the impact of the crisis on British farmers. The evidence about the behaviour of consumer markets strongly suggests that, although he had a choice, the decision that he made was correct. If a crisis is serious enough, it is better (particularly as the market leader) to overreact than to underreact. What consumers then remember is that their fears have been taken seriously. Government finds it hard to

overreact. It failed to take a lead, or to gain public trust.

A worldwide ban on all exports of British cattle, beef, meat products and derivatives, such as gelatine, had been imposed by the European Commission on 27th March. Tactically the Commission's handling was poor, in that the ban was of indefinite duration and worldwide, which would make any form of relaxation more difficult later. However, within the Commission this was not an easy crisis to handle, because it raised issues of competence and procedure, and put the Commission in the unenviable position of mediating between members whose interests were irreconcilable. (It is worth remembering also that, since the Commission is itself a microcosm of the European Union, any conflict among members is also likely to be mirrored by conflicts within the Commission. In this instance, Sir Leon Brittain and Neil Kinnock found themselves trying to safeguard British interests in a highly hostile environment.) Once the ban had been imposed, British efforts were directed towards getting it lifted in whole or in part. In April 1996, the Federation of Fresh Meat Wholesalers, in evidence to the Agriculture and Health Committees of the House of Commons, estimated the value of beef exports at £520 million a year, in addition to the disastrous impact of the crisis on the home market. Nevertheless the immediate priority for the Government on the international front was not so much beef exports as the threat posed to Britain's highly lucrative, multi-billion pound pharmaceutical industry, which made some use of beef by-products, for example in pill coatings.

In heading off this threat the British Government was successful, leading to a partial lifting of the ban by the Commission, but this was virtually its only tangible success on the European front in the months of manoeuvring that followed.

Once the ban had been imposed, Britain was in the position of needing to persuade other members that it was safe to lift it. For a whole range of reasons, this was a tough task.

For one thing, the German and French Governments (the most influential in the Union) were far more concerned about the domestic consumer panics and the plight of their own farmers, because the bottom had fallen out of their domestic markets for beef. As the British Federation of Fresh Meat Wholesalers put it in a memorandum to the House of Commons Select Committees on Agriculture and Health: 'While there is evidence of some recovery of domestic confidence in British beef, we believe that the likelihood of reopening export markets is remote for some considerable time. The need to remove the EC ban is no longer urgent. Even if there was a political will, overseas consumer concerns will remain, and restrictions on British beef availability will make our product uneconomical overseas for the foreseeable future'.[28]

In addition, however, there were old scores to settle, with a legacy of mistrust and suspicion, on both sides, between Britain and its European partners. Britain has so often seemed reluctant within the Union. Here, in the eyes of other members, it needed to act as a supplicant. Yet in the lead-up to the Florence Summit on 21st and 22nd June, the UK did not behave like a supplicant, but instead pursued a policy of non-cooperation, holding up all other business – a course which other members saw as wholly unjustified by the facts, and as contrary to the letter (Article 5) and the spirit of the Treaties. This action was seen as confirming Britain's lack of commitment to the Union, and our untrustworthiness.

Part of the problem was the irresistible temptation for the British Government to play British politics on the European stage. British farmers were convinced that continental farmers were astute at covering up their own problems of BSE, and that the Eurocrats in Brussels were their enemies. Conservative voters, deeply divided in their views about Britain's membership of the Union, were only too ready to unite around a theme of alleged unfair discrimination by the Commission against British beef. (Ironically the Commission was meanwhile being accused by the rest of Europe of a cover-up on

BSE, for having accepted reassurances from the British in the preceding eight years.) Her Majesty's Government was bound to want to divert attention from any mistakes that it might have made, and to evade calls for an Inquiry. Faced with a vanishing majority in the House of Commons and an impending General Election, which it was expected to lose, British Government needed a scapegoat, a 'Falklands factor' to swing voters behind it (Box 12). Injustice against Britain by the European Union was much too tempting a line for the British Government to be able to resist, at least at times, in order to unite its own followers, divert the anger of the farmers and provide a rallying cry for the public at large.

In advance of the Florence meeting, British Government policy was based partly on this domestic need to cast the European Union in general, and the Commission in particular, in the role of enemy, while taking steps to seek to restore consumer confidence and make the lifting of the export ban more feasible. When the crisis broke on 20th March, SEAC had recommended a total ban on the use of meat and bone meal (MBM) in feed for all farm animals, and tighter control than previously on processing carcasses from cattle over 30 months of age when slaughtered. The Government duly imposed the ban on MBM and went further than the SEAC recommendation in also banning all beef from animals over 30 months from entering the food chain. The impetus for the 30-month ban, incidentally, came not from the scientists, but from the supermarkets, thus neatly illustrating an important theme of this whole story: while Government may say that its policies are based on the best scientific advice (and genuinely intend this), in practice consumer opinion and political pressures are at least as important as science.

John Major went to Florence seeking an accommodation with the other Heads of Government, yet not being able to afford anything that might be interpreted by British public opinion as weakness. He is much too intelligent a man to believe that the Commission could ignore the collapse of

Box 12

The Falklands factor

Mr Paul Tyler MP
'We all know that when a Government are having trouble at home, an overseas diversion – preferably a little war – can be extremely convenient.'

Source: House of Commons *Hansard* for 17th February 1997, column 644.

May 31, 1996: British food crises provoke an open revolt in Europe

Source: *The Times*, Tuesday 18th March 1997.

consumer confidence and the pressure of Member States, however dubious its actions might be constitutionally. On the other hand he had to defend Britain's policy of non-cooperation in normal business, which was causing fury to other partners in the Union, and was justifiable only if Britain was being unjustly treated. It was not an easy tightrope to walk.

Among other Heads of Government there was little patience with the British position, although many were conscious that the crisis was hitting their own farmers, not the British alone. The Commission's priority was to try to break the deadlock, so that other business did not continue to be held up, and to prepare the way for lifting the export ban at some future time. Serious as the crisis was in terms of human health, it was even worse than that in the context of European politics, threatening to escalate into a showdown between Britain and the rest of the community.

What came out of Florence was a pragmatic framework for future action that had no particular basis in science. The text is given in Box 13. The framework might lead to a gradual relaxation of the restrictions governing UK beef and related exports, provided that its conditions were met. The onus for implementation lay on the United Kingdom which was to report its actions to the Commission and, in some instances, obtain the approval of its Standing Veterinary Committee. The Commission would then suggest detailed decisions, step by step, to ease the ban, when, based on scientific and technical advice, it believed that it had become safe to do so. The decisions were to be based exclusively on public health and objective scientific criteria. Within the framework, an action plan was envisaged, to include a mandatory cull of animals belonging to specified birth cohorts, meaning cattle exposed to the same conditions as animals that had contracted BSE. The cull was expected to lead to the slaughter of 140,000 cattle. In addition, a passport system must be introduced, to identify the origin and life history of all cattle in the European Union; there were to be more stringent controls of firms that manufacture animal feed; and a detailed veterinary study was to be made of all farms affected by BSE in order to identify which animals must be culled. As already resolved by the UK Government in April, no cattle slaughtered at an age over 30 months were to be allowed to enter the food chain, nor were 'specified bovine offals' (meaning parts that might carry

Box 13

Presidency Conclusions – Florence, 21st and 22nd June 1996

Bovine Spongiform Encephalopathy (BSE)

The European Council welcomes the paper from the Commission setting out its position on the framework for the eradication of BSE in cattle in the United Kingdom and for the restoration of a single market in beef. It agrees that the Commission document now enables the follow-up to go forward according to the procedures set out in it. The framework stipulates the action which the United Kingdom is taking, and is committed to take in the future, in order to accelerate the disappearance of the disease, which when in place will bring about a step by step relaxation of the current restrictions on the export of bovine products from the United Kingdom to the rest of the European Union and to third countries. It invites the Commission to present the appropriate decisions when it considers that the necessary conditions, based on scientific and technical advice, have been fulfilled. Such decisions will be taken only and exclusively on the basis of public health and objective scientific criteria and of the judgement of the Commission, in accordance with the existing procedures, that these criteria have been satisfied.

The European Council points to the importance of adequate support for producers seriously affected by the fall in beef consumption and by the impact on market prices. The Commission has submitted an amending budget involving ECU 650 million plus a reserve of ECU 200 million available for allocation to support the beef market. The European Council, for its part, decides that funding of ECU 850 million will be devoted to supporting European livestock farmers seriously affected by this crisis.

The Presidency declared that if in the meantime a third country requests a supply of British beef exclusively for its domestic market the request will be examined by the Commission within the overall framework after consulting the appropriate scientific and veterinary committees.

infection) to do so. Payment of compensation, incidentally, was to be made in substantial part by the Community, not the British Government alone.

The strength of the Florence agreement was that it was a negotiated settlement, reached by consensus, that provided a viable path out of a highly charged political crisis; it enabled Her Majesty's Government to find an escape route from a cul-de-sac that it had devised for itself. Its weakness was that it had left objective evidence (in the form of science) behind. The cull has no objective merit as a means of eliminating BSE or reducing any associated risks to human health. An important article by R M Anderson and others, in *Nature* in August 1996, demonstrated convincingly that the BSE crisis is almost certainly already near its natural end.[29] Assuming that the original source was MBM, and that new infections from this source were close to zero by the end of 1994, then the sole remaining means of natural transmission (from mother to calf) will not sustain the epidemic. Without any culling at all, the epidemic is likely to work itself out by around the year 2001. Between August 1996 and 2001, some 7,000 more cases of BSE would be likely to occur. A cull could avoid some of these, but it would be at the cost of slaughtering healthy cattle in the process, since as yet we have no reliable test for the disease in living animals: we have to kill first and verify afterwards. At one extreme, therefore, one could kill off the entire British cattle population at once, avoiding a likely 7,000 cases, at a 'price' of some 1,300 cattle culled per BSE case saved. Other culling policies offer a better return (Box 14) but, bearing in mind feasibility as much as economics, it is questionable whether at this stage any culling policy is actually more cost-effective than doing nothing.

This is the language of statistical probabilities, which is as much science as the language of the laboratory, but is a different science. It offers a legitimate basis for British politicians, like Douglas Hogg, to argue that the Florence consensus should not be binding. The argument may also have

Comparison of possible culling policies (from Anderson RM *et al.*(1996) with cost figures added)

No.	Culling policy description	Cases saved		Total cattle culled		No. of origin holdings	Cattle culled per case saved	Cost per case saved
		Number	%	Number	%			
1	All cattle	6,950	100	9,360,000	100	111,000	1,300	£1.3M
	Age-targeted							
2	All cattle born before 7/88	250	4	352,000	3.8	<111,000	1,400	£1.4M
3	All cattle born 10/90-6/93	3,600	51	2,030,000	22	<111,000	564	£564,000
	Herd-targeted (case)							
4	All cattle born in herds from which a case originated during 1/91-12/95	6,300	90	2,870,000	31	28,500	455	£455,000
5	Cattle born in the 10/90-6/91, 7/91-6/92 or 7/92-6/93 cohorts in herds from which a case originated in the corresponding cohort during 1/91-12/95 (govt. policy)	650	9	30,100	0.32	1,460	4	£46,000

No.	Culling policy description	Cases saved		Total cattle culled		No. of origin holdings	Cattle culled per case saved	Cost per case saved
		Number	%	Number	%			
6	As 5 but extended to include 7/89-9/90 cohort (govt. compulsory + voluntary policy)	1,580	23	127,000	1.4	6,240	80	£80,000
	Herd-targeted (Incidence)							
7	Cattle born in 7/89-6/92 in herds with more than 1 case in that cohort range (during 1/91-12/95) per 27 cattle in the holding as a whole	691	10	21,300	0.23	638	31	£31,000
8	As 7 but with a threshold of 1case per 50 cattle	1,420	20	71,900	0.77	2,000	51	£51,000
	Maternally targeted							
9	Cattle born after 10/90 within six months of BSE case in the dam	797	11	<22,000	0.24	<22,000	28	£28,000
10	Cattle born after 10/90 within 12 months of BSE case in the dam	1,100	22	<44,000	0.47	<35,600	40	£40,000

No.	Culling policy description	Cases saved		Total cattle culled		No. of origin holdings	Cattle culled per case saved	Cost per case saved
		Number	%	Number	%			
	Combined herd-targeted and maternally targeted policies							
11	Incidence (1 per 27) + maternally targeted policy = policies 7 and 9 combined	1,490	21	<44,000	0.47	<25,500	30	£30,000
12	Incidence (1 per 50) + maternally targeted policy = policies 8 and 9 combined	2,220	32	<94,000	1.0	<26,800	42	£42,000
13	Govt. compulsory + maternally targeted policy = policies 5 and 9 combined	1,450	21	<53,000	0.57	<26,300	37	£37,000
14	Govt. inc. voluntary + maternally targeted policy = policies 6 and 9 combined	2,380	34	<150,000	1.6	<31,000	63	£63,000

Notes

1. Projections are made using the model with 10% maternal transmission over 6 months (unless otherwise stated) and refer to cases saved over the period 1997 to 2001 achieved by a culling policy implemented at the end of 1996. Values are to 3 sig. figs., percentages to 2 sig. figs.
2. For other detailed footnotes of the assumptions made in the calculations see source.
3. It is hard to get a reliable figure for the cost per animal of the 1.3 million cattle killed up to the end of 1996. Compensation to farmers probably averaged £500 to £700. Then there was an amount of some £150 per animal (£200 million in total) paid to the rendering industry. There are still substantial costs to come in disposing of stockpiled carcasses and waste. Overall, an estimate of £1,000 per animal is probably not far wide of the mark. This is the figure that I have used.

Source: R M Anderson *et al.* (1996) *Nature*, vol. 382, p. 787.

been influenced by dislike of the enforced cull by British farmers. At first the latter were highly antagonistic, although they later came around to it because it offered an opportunity to begin to restore consumer confidence. It also eased their cashflow problems. Nevertheless, they hate destroying good animals.

The fact is, however, that the Florence agreement never had much to do with science, but with realpolitik. From the viewpoint of other European Governments, they went as far as (or further than) they could have been expected to go, in agreeing a framework for action towards the ultimate lifting of the export ban on British beef. Either Britain acts in accordance with the agreement, or the deal is off. There is no point in our asserting, either to the Standing Veterinary Committee beforehand or to the public afterwards, that the agreed cull of some 140,000 cattle is scientifically flawed. Even if the British people are convinced, a deal is a deal, which other European governments (driven, among other things, by their own electorates) are not in any hurry to make less stringent. Whether and when the European Community will lift the ban is uncertain, even after the UK Government has executed the cull. What one can be fairly sure of, however, is that a unilateral retrospective denunciation of the agreement by the UK, however justified that denunciation may be by the scientific evidence, is not going to impress the other partners in the Union.

Naturally all this looks different from the viewpoint of British farmers. On them the impact has been serious and, in a few cases, disastrous. By the end of 1996 a very large number of cattle had been slaughtered as a result of BSE. Quite how many is open to debate, but Government has said more than a million, representing around 10 per cent of the national herd. This mainly represented the result of the ban (imposed by the Government in April) on animals aged more than 30 months at death from entering the food chain, although in addition there were schemes of compensation for calves which also

affected the slaughter programme. Obviously such programmes involved not only the slaughter of large numbers of animals, but also the disposal of the carcasses by incineration. There was a huge problem of lack of capacity, much more serious in some parts of the country than in others. At one point, in the summer, the Ministry estimated there was a backlog of 600,000 cattle to be culled under the 30-month rule, at a time when around 55,000 animals a week were being destroyed and incinerated. The estimate was wrong, because farmers were determined not to put in for less than their qualifying number and hence returned inflated figures. Meanwhile they were finding it impossible to discover when their animals would be accepted and, as there continued to be a market in these cattle at a discount on the slaughter price, it seems likely that in some cases money was changing hands to jump the queue.

Those who hung onto their cows, waiting for the summons to the abattoir had, of course, to use grazing to keep them alive – not only a waste in itself, but an incursion into feed that they would need for their herd in the winter.

A registration scheme was introduced by the Ministry, to identify those waiting to be culled and to introduce order. Forms had to be completed before cattle were sent for slaughter and the theory was 'no form, no compensation'. There was chaos for a while, with forms going astray and most people not understanding the scheme, which was short-lived. In retrospect, however, it proved to be a turning point – perhaps by clarifying the size of the queue and reducing whatever chicanery had been going on. Quite soon, the situation improved and by the year-end the backlog for the 30-month scheme had been eliminated, and schemes affecting calves (to eliminate anticipated surpluses) were also working in an orderly way. On the other hand, there was still a stockpile of MBM, tallow and carcasses waiting to be destroyed – an unexploded time bomb ticking away until the public came to know about it.[30]

Meanwhile the Government appeared to be dragging its

feet on the cull agreed at Florence, as the scientific basis for it was put in doubt. Even though the compensation terms (to be met in part from Brussels) were generous, the cull was initially unpopular with farmers, who rightly saw it as likely to destroy many healthy animals per BSE case avoided. The rules for identifying those to be culled were inevitably going to be complicated, and were likely to leave substantial room for judgement by those administering the scheme as to precisely which cattle belonged to the same birth cohorts as known BSE cases. Not having much confidence in the validity of the scheme, would those who interpreted the rules use tight definitions and hence drastically reduce the number of animals qualifying for slaughter? If so, would that satisfy the European Commission? And whether or not the Commission were satisfied, would that have any effect on exports in practice? Early in 1997, news of the first BSE case in a cow born in Germany, and the German reactions to it, were anything but hopeful. It now seems likely to have been a case of illegal importation – the eartag had been tampered with – rather than maternal transmission. At all events it stoked fears that were already barely contained.

Quite what has happened to beef consumption, beef prices and cattle prices in all this is not easy to describe with precision. In the UK, beef consumption dropped and rose again, although it remains below the level that prevailed before the crisis broke. While prime cuts are almost back to previous consumption, mince remains well down. British exports (worth some £520 million per annum) have stopped. Beef consumption in continental Europe also fell, affecting not only imports but also domestic products. Other countries' consumption was affected, for example in the Middle East.

Cattle prices have fallen, but they were bound to do so in the autumn, because feeding cattle through the winter is expensive. Undoubtedly, however, there was a fall in prices after the March announcements. Calf prices were particularly sharply affected, although there has been some recovery since

then and the calf compensation scheme should put a floor under the price.

The majority of farmers have ridden out the crisis reasonably well, although it has not been a comfortable experience. Many are not solely or mainly dependent on beef: the whole point of mixed farming is that it hedges bets. For example, sheep did well in 1996 precisely because beef did badly. Dairy farmers have been much less badly hit than beef farmers, and that will continue to be the case, so long as there is no fear of infection through milk. Farmers with 'set-aside' did well because they were allowed to use it to graze their cattle awaiting slaughter at the time of the backlog.

A minority of farmers have, however, been devastated and some suicides have resulted. Specialist beef producers who supplied export markets (e.g. farmers in north-east Scotland) and pedigree breeders are likely to have been the hardest hit, plus those whose livelihood depended on beef, yet who were typically not paid under compensation schemes, such as hauliers to the continent and those involved in buying and selling cattle.

Turning from BSE to CJD, by 31st December 1996, the tally of new-type CJD cases had risen from 10 to 14, of which 12 had died. By 20th March 1997 (the anniversary of the Dorrell/Hogg statements) the total cases had risen to 16. So far as it goes, the relatively small rise in cases since March 1996 is good news. But it is much too early yet to be able to predict the future incidence and hence the overall scale of the epidemic. On 26th November, *The Independent* had reported Dr James Ironside of the CJD Surveillance Unit in Edinburgh as saying 'It looks as though the total number of cases over the whole course of the disease will be in the hundreds, rather than the thousands'. Later, Dr Ironside told *The Lancet* that he had been quoted incorrectly. At a meeting of the Royal Statistical Society on the same day, Professor Adrian Smith, its President, told the press that the predictable size of the epidemic remained much as it was: anything from the cases

that we know about so far, to millions.[31] The longer that any substantial increase is delayed, the better. But it will be years before we can be sure. Meanwhile Professor Adrian Smith's answer is better than any statement such as that attributed to Dr Ironside, reassuring as that might seem to be. The fact is that nobody yet knows how many more new-style CJD cases there will be.

Chapter 4

Tentative lessons

From this complicated, tragic and still far from complete story, I want to extract four issues and suggest tentative lessons relating to them. This is not in the tradition of exposing the incompetence or complicity of governments, as in the poll-tax débâcle[32] or arms to Iraq.[33] It is more like the study of the swine flu affair[34] in the United States or the marvellous analysis by Allinson of the Cuban Missile Crisis,[35] in that it seeks to extract lessons without attributing blame. There is little in this story to identify 'good guys' (in white hats, by the convention of Western films) from 'bad guys' (in black hats). For the purposes of this paper, it is the issues that matter, not attributing blame.

The four issues extracted for discussion here are:

1. Can MAFF be trusted in its dual role of (on the one hand) responsibility for agriculture and fisheries, and sponsor of the food industry, and (on the other) guarantor of food safety?
2. Can anything be learned from this case for the future handling of the connections between science, policy and politics, including the explanation of risk and uncertainty?
3. Has the European dimension of UK policy been well handled?
4. Are there lessons for farming and food policy?

I will suggest that the answer to the first and third questions is 'no'; to the second and fourth 'yes', while acknowledging that the interface with science has in many respects been dealt with competently and with integrity by both the scientists and the politicians.

MAFF and food safety

To farmers, the idea that MAFF is too much on their side may seem absurd. Nevertheless the Ministry is responsible for the prosperity of agriculture, including inevitably the standing of the Government of the day (of whatever party) with agricultural voters. Among other things, the Ministry has to stand up for British farming and fisheries, and all the commercial activities related to them, on the European scene. It sometimes seems that the various regulations and subsidies orchestrated by Brussels are more important than anything else in determining farmers' incomes throughout the European Union!

In assessing MAFF's record in holding the balance between agricultural interests and food safety, there are three distinct periods to consider. The first, from November 1986 when the disease was identified to the publication of the Southwood Report in February 1989, was the handling of the initial phase. The second, from then until March 1996, involved implementing measures to manage the BSE epidemic and to monitor what happened: it had an important European, as well as domestic, dimension. The third began with the crisis announcement by Ministers in March 1996 that there might after all be a link between BSE and a number of human deaths from a new form of CJD. In this last phase MAFF has had to cover the European dimension from an agricultural and industrial standpoint, and the implementation in Britain of the various culls and compensation schemes.

There were delays in the first of these periods: six months between identifying the disease and telling the Agriculture Minister and a further nine months before Health Ministers were informed; seven months between concluding that MBM was the only viable hypothesis for the cause of BSE and implementing a ban on its use in July 1988. However, it is particularly in the second period that MAFF looks (with hindsight) to have taken its food responsibilities too lightly. If the very large number of BSE cases (about 30,000)[36] that

occurred in cattle born after the ban came into force has to be attributed primarily to failures to make the ban effective, then the Ministry looks to have been both incompetent and negligent in planning and executing the ban.

Where were the loopholes in the ban? Was it contamination in the abattoirs, where we now know that there were widespread failings in the handling of specified bovine offal? Or failures in the food mills, or misuse of stocks in hand at the time of the ban? Or continuing use by farmers, since the ban applied to cattle, but not to all farm animals? Or some combination of all of these? Knowing as we now think we do, that BSE is not (under normal circumstances) readily infectious, it is hard to credit that the cause of continuing infection in animals born after the ban was imposed was due to small traces of some kind, somewhere in the supply, distribution and storage systems. If that is not the explanation, and if transmission from cow to calf is relatively rare, there must have been major breaches of the rules. An alternative hypothesis stems from the fact that very small quantities of infected material (such as existed in MBM) can be lethal. This could be called the roulette hypothesis: that randomly distributed within MBM were small lethal concentrations.

A factor in the relaxed view of all this taken at the time by Government was, no doubt, the judgement that BSE almost certainly did not constitute a risk to human health. That was the conclusion of the Southwood Committee, and was fully in line with prevailing scientific opinion. It was also the unqualified view of Dr David Tyrrell as chairman of SEAC (see Box 6, page 13, 24th July 1990). But, as the Southwood Committee also recognised, there was a risk that the prevailing opinion was wrong. Because the implications, should this after all prove to be the case, were so horrendous, a 'food watchdog' ought to have taken them intensely seriously. The record suggests that MAFF's handling of BSE during this period (prior to the crisis in March 1996) was based on assumptions that there was no risk to human health, and that what had to be

done was about managing a nasty problem in animal health, without destabilising British agriculture. Had the premise that there was no risk to human health proved correct, criticism of MAFF would look pedantic and cranky. But in matters of food safety somebody needs to be pedantic, without being cranky. What Southwood did was to assess the evidence on the balance of probabilities. So far, so good. With human health at risk, however, there is a strong argument for a different onus of proof: that any serious threat (even if apparently slight) should be taken extremely seriously. By embedding food safety in MAFF we more or less require that the pragmatic balancing of different interests (consumer safety; producer profitability; the national economy, public expenditure and the balance of payments) is done behind closed doors, deep in the recesses of the Ministry.

Proposals for change have included giving food safety to the Department of Health, or agriculture as an economic activity to the Department of Trade and Industry. While these changes might make conflicts of interest slightly less hidden, they might not go far enough. All Departments are of course Departments of Government, and their roles include, among other things, executing the decisions of the Government of the day and minimising embarrassments to it. A subject like food safety is one where the public has limited confidence in Government. That being so, there would be merit in establishing a wholly independent watchdog agency in this field, along the lines of the American Food and Drugs Administration (which is, however, located within the Department of Health and Human Services) or the Australian National Food Authority.

What was announced by the previous Government[37] was a Food Safety Adviser and Food Safety Council, probably within the Cabinet Office. The Adviser and the Council members would be scientists, similar presumably to the present members of SEAC. On the face of it, it is hard to see where the advantage of these proposals lies. Currently, SEAC is respected

both outside and inside Government. Nobody doubts its independence. Taking it inside Government seems – from the viewpoint of public confidence – to have more drawbacks than merits.

The new administration has acknowledged that things must not be left as they are. Probably the best long-term solution is a statutory Food Safety Authority, with a public duty to report, accountable to parliament through the Secretary of State for Health. The reporting line would need to go via the Chief Medical Officer. One would expect the Minister of State for Public Health to take a close ministerial interest. The current unsatisfactory confusion of roles within MAFF must be ended.

Science, policy and politics

In many ways, the BSE story provides an object lesson in how Government can draw upon expert scientific advice, in a way that all parties (including the public) understand and respect. The Southwood Working Party, the Tyrrell Committee and its successor the Spongiform Encephalopathy Advisory Committee (SEAC) all have a good record, in terms of absorbing and explaining the state of the scientific evidence in a complex, changing field. If, as some have argued,[38] the committees have at times been too narrowly specialised in their composition, that message has been listened to in terms of the make-up of SEAC. Few have criticised the competence or integrity of any of the scientific committees, nor their willingness to explain themselves to the public at large. Nor are there signs that Government has sought to influence or censor their advice. Early on in the story, Ministers seem to have taken the view that their best policy was to be guided by the scientists and make public the advice given to them. As one of the key scientists put it to me in private conversation: 'The Cabinet truly was motivated to understand. We were put under no pressure to manipulate anything and, since the crisis broke, they have published everything that we have said'.

That does not mean, however, that everything has been

perfect. A problem that arose quite early in the story, and has had some impact on how it has unfolded, is the dominance of orthodoxy within science. In spite of the setting up of the Tyrrell Committee to promote research and to monitor BSE, a substantial research programme was not put in place soon enough, no doubt because of sharp retrenchment in agricultural R&D and probably also because BSE was not then seen as a serious threat to human health. MAFF was at this stage feeble in promoting research. Moreover, what research funding there was tended to go to the laboratory scientists rather than to the epidemiologists, and to those who themselves subscribed to the orthodox view that BSE was an animal, not a human, problem. In a case like this – where there is a small but real risk that the prevailing optimism is wrong, with dire implications – the most important research may be enquiry that challenges the existing orthodoxy. This is certainly not a justification for financing work that has no credible scientific basis. It is an argument for nurturing alternative hypotheses, and for drawing on a wide range of scientific disciplines, including epidemiology, economics, social policy and anthropology.

A second problem on the interface between science, policy and politics is about uncertainty and risk. There is a large body of literature about risk,[39] but most of us find the concepts hard to understand. We – and hence politicians – like certainty. 'British beef is 100 per cent safe', is the type of message that the British Government felt obliged to give. Scientists are seldom so sure. Yet we are not fools. If politicians tell us something is 100 per cent safe when it is not, then we do not trust them another time (see Box 15).

It is not only Ministers who reach for certainties. The all-party Select Committees show the same tendency in their questioning of witnesses. Dr Stephen Dealler, for example, was questioned in a different, less respectful, more sceptical tone than other scientists, when trying to explain concepts of risk and to suggest that different assumptions were possible than

Box 15

'100 per cent safe'

Mr Alan W Williams (MP, Cardiff)
'Many comments have been made about whether we were following good science. I followed the matter in the late 1980s and into the 1990s and I have attended virtually every BSE debate. I promise the House that no scientist throughout that time ruled out the connection between BSE and Creutzfeldt–Jakob disease. It was always possible – it could never have been ruled out – yet the Government continued to maintain that beef was perfectly safe. In December 1995, the Secretary of State for Health said it was "inconceivable" that CJD could be caused by BSE. Ministers were corrupting scientific advice; no scientist said that the link was inconceivable – it was Ministers who used that word.'

Source: House of Commons *Hansard* for 17th February 1997: Opposition Day Debate on BSE Crisis.

Box 16

Parliamentary Select Committees and Risk

Mr Powell MP
'I represent the consumers and the farmers – who are also consumers – in the north-east Northampton area. They are anxious in a way which I have never known before – and I suspect I speak for everybody else in this room when I say that – and a doctor of very great experience said to me on Friday that I was 200,000 times more likely to get cancer from smoking than I was to get CJD. Would you find that an inappropriate remark from an experienced doctor?'

Sir Kenneth Calman, Chief Medical Officer
'It is a remark which I think it is very easy to make. I think the issue ... is the issue of what is the risk? I think this is one of the most interesting issues for this committee.'

Mr Powell MP
'Lord Wyatt, in an article in *The Times* yesterday, suggested that women were 50,000 times more likely to get breast cancer than they were to get CJD. Was Lord Wyatt wrong to make that remark?'

Sir Kenneth Calman (para 33)
'... if we look at the evidence across the board, the evidence ... does suggest that the risk is extremely low. If you compare that to cigarette smoking, crossing the street or getting breast cancer, then you can make a whole series of assumptions about that.'

Sir Kenneth Calman (para 112)
'The issue which is much more important in public terms (than precisely quantifying the risk) is the perception of that risk. We already have ways in which we perceive the risk of crossing the road; we know that cigarette smoking is not a good thing to do, yet 27 per cent of the population in this country continue to smoke cigarettes. There is no question that there is a risk there; that risk is very clear, and the perception is "It won't happen to me". I think the issue which you have raised, and the public response, has been that the risk has been perceived to be much greater than I think the science says.'

Professor Pattison (para 121)
'... if you want to achieve zero risk in anything in life the only way to do that is to avoid it completely. I can tell you from a personal point of view that that thinking also applies to my thinking about (eating beef and) my two grandchildren.'

Dr Dealler (para 280)
'... I think at the moment the worry is that if you do not know whether something is a risk or it is not, if it is a fatal disease with no method of treatment, do you assume it to be a risk at present or do you assume it not to be a risk at present, and this has been one of the problems with BSE from the beginning. Being on the medical side, we always assume something to be a risk until there is adequate evidence that the risk is not high or the risk is not there, which does not seem to be so much the position that was taken by the Southwood Committee, for instance, which recommended that it was okay to continue eating bovine brain, which is obviously a different line of position being taken, and I think in some way the agriculture and the health people must come together to decide what the acceptability would be for risk to be taken and a risk assessment must be done.'

Mr Bayley MP and Mr Meldrum, Chief Veterinary Officer of MAFF (para 310)

Mr Bayley
'Subsequently you banned the use of bovine products in vaccines for cattle, so something must have changed to make you feel that the results of that research perhaps were not as conclusive as you felt at the time – otherwise you would not have banned the use of bovine products in veterinary vaccines at a later date?'

Mr Meldrum
'An interesting question you ask, but I would offer a different answer. The answer I would give you is that we have all along taken an ultra-precautionary route as far as BSE is concerned, contrary to what Dr Dealler may suggest. We have done it all along, right from the word go. We have assumed that BSE might affect man and, on that basis, we have built up our controls ...'

Professor Lang and Mr Spring MP (para 356–357)

Professor Lang
'... Even if MAFF and Mr Hogg, repeating what Mr Gummer and Mr Dorrell said back in 1989 when he was a Junior Minister of Health, say that beef is 100 per cent safe, I do not think the public now believes that view. That is why I quoted earlier an opinion poll of only two weeks ago. You are essentially having promises of certainty put into a situation of uncertainty as far as the consumer is concerned. The issue now is the psychology of risk. There is a burgeoning literature by academics that I would recommend the Committee spend some time looking at.'

Mr Spring
'I think Members of Parliament know about the psychology of risk.'

Professor Lang
'I am not certain that is true, with respect.'

Professor Lang, Centre for Food Policy, Thames Valley University (in a written memorandum to the Committees)

'BSE has provided an object lesson in how not to manage risk. Eight years into the crisis, too much attention has been paid to too narrow a conception of science and not enough attention has been paid to failings of public policy with regard to consumers, decision-making at MAFF and information flow to the public...'

The dangers of excessive reliance upon risk assessment: risk versus trust

'BSE has highlighted the centrality of risk in public and individual decision-making. Risk assessment tools are widely used – for example in control of food-poisoning risks – and have been widely promoted in the UK, following the Food Safety Act 1990. Excessive reliance on the technique can, however, pose risks of a different sort. Companies and Government can easily turn to risk assessment to try to manage and contain consumer volatility. If used in this way, it sets up a polarity between the expert – "we know best, don't worry your pretty little heads" – and the consumer. Treat people like children and they behave accordingly, quickly sensing victimhood.

'When choosing foods, studies have shown that even in low-risk situations, consumers act to reduce risk. The dimension of perceived risks include the physical, financial, emotional, social and time. Such studies suggest that the government's reliance upon science to inform consumers about risk was entirely inappropriate. Instead of meeting consumers half-way and addressing their concerns, government advice was perceived as hectoring, irrelevant, inappropriate and insensitive. This failure of management of risk communication is one of the more serious failings to be exposed by the BSE saga.'

Source: House of Commons Agriculture and Health Committees' Joint Report: *BSE and CJD: Recent Developments*, 1996.

those made by others.[40] (Professor Lang, a psychologist by background, had a similarly hard time.)

As Box 16 shows, issues about risk received considerable attention at the joint meeting of the House of Commons Agriculture and Health Committees. Mr William Powell (MP for Corby) pointed out the relatively low risk from CJD. But, as Sir Kenneth Calman (the Chief Medical Officer) said, this is not only about actual risk, but about perceptions and psychology. The public was more alarmed than Mr Powell. Why should that be so? There is evidence from the literature on public and private transport that people dislike risks over

which they have no control, and are more ready to accept risks when they have (or think they have) a measure of choice. Thus safety standards are higher on public transport than for cars. The evidence also suggests that where there is risk of death, even a small risk, people are highly risk-averse. Manufactured food (which beef is, in effect), which has a small risk of being deadly, scores on both counts. Put another way, the benefits of taking the risk of eating infected food would (for many people) have to be very high to be worthwhile. Yet they can actually choose to eat something else. The trouble, however, is that in this instance the harm (if harm there is) has already been done. So the Government is seen to have lulled people into a false sense of security when they had choice, and hence Government foreclosed their options. Perhaps one lesson is that Government should adopt generally the ultra-cautious approach it has settled for in road safety. Despite Mr Meldrum's assertion that the Government has adopted a precautionary, risk-averse approach throughout the BSE story, this is not the case – except in the instance of pharmaceutical products using bovine-derived materials. Here the Government guidelines issued to the industry in 1989 said that 'all bovine materials used in medicinal products, including serum, should be sourced from outside the UK and should come from healthy herds which had not been fed material of animal origin'. By 1991 all UK companies had, where necessary, changed their sources.[41] There is a niggle here. Why, one wonders, are pharmaceutical products different from food? Why, if a precautionary approach is right for the first, is it not equally right for the second?

On a number of public policy issues (such as acidification, Brent Spar) the UK Government has been openly sceptical about the precautionary approach. The latter is not without its problems, but it does at least recognise that what is important in a risk is not just the objective probabilities, but how far we need to take it, and what the alternatives are. One of the underlying difficulties between the UK Government and (for

example) the German may well have lain in different cultural attitudes to risk.

A telling recent instance of the difficulty of handling risk and uncertainty in the public arena was provided on 26th November by *The Independent*. It quoted Dr James Ironside from the CJD Surveillance Unit, Edinburgh, as saying 'It looks as though the total number of cases over the whole course of the disease will be in the hundreds, rather than the thousands'. We would all like to believe that. The fact that there have been only six new cases since March 1996, must be good news. And indeed it is, but only in the sense that the longer bad news is delayed, the better and the less likely the Doomsday scenario. But uncertainties are such that we still have no idea of the overall size of the epidemic, nor even that there will be one, in the popular sense of something that goes beyond individual tragedy to the collective. The more reliable answer was that given by Professor Adrian Smith: it could range from no more cases to millions.[31]

There is no easy answer to the question 'how can we all do a better job of understanding and explaining risk and uncertainty?' Any answer must, however, be based on principles of truth, accuracy and non-condescension. We have a long way to go, although possibly the relatively phlegmatic response of the British public in recent months, and the recovery of beef consumption in Britain, owes something to a realisation that – on current evidence – the main risks lie in the past. Those most at risk (if indeed we are right about the risks) ate suspect beef ten years ago.

The scientists, on the other hand, are quite likely to view politics as irrational, whereas it has its own rationality. What the scientists say, and how they say it, influences public responses, and hence the political context. But, in the main, the scientists are unlikely to have an instinct for a viable path through a political minefield such as the BSE story has presented. The formulation of policy cannot safely be left to scientists, any more than scientific truth is safe with

politicians. In this case, policy seemed (at least for a while) to fall into a void between the two. When Ministers made their joint statements in March 1996 about the possible link between BSE and new-style CJD, the policies that they announced at the same time were hopelessly inadequate: a little more money for research, a long overdue tightening of controls on meat processing and a ban on MBM for all farm animals. These measures were never going to restore consumer confidence, either in Britain or (still less) overseas. Ministers then seemed willing to debate publicly all possible options, from slaughtering the entire cattle population, to doing nothing at all, with a clear preference for the latter. It was as though a producer of baby foods, knowing that the products on the supermarket shelves might be lethal, were to seek to reassure the public that the risks were slight and nothing much need be done.

It also appears from this case that the higher the political temperature has become, the smaller the influence that science has had. As one senior civil servant closely involved put it to me: 'once the politics took over, science fled'. The cull agreed in Florence as the basis for European policy has the flimsiest scientific base, which makes it hard to explain and to defend, and difficult to implement: what is a birth cohort and which animals are most likely to have been exposed to infected MBM? Since this is a European agreement one can scarcely blame the British Government for it, but it has put the latter yet again in the position of procrastinating towards Europe, appearing to renege on a deal and, in the end, imposing on British farmers a policy that can be seen to be hopelessly flawed. While the respect for science shown by Government at many points in this story is impressive, the actual response to the crisis is not. The British Government seems constantly to be doing too little, too late, and in the end being forced into implementing a policy in which it can be seen to have no confidence, and which has no scientific base. Much of the problem lies with playing politics on the European scene,

rather than focusing on handling the domestic aspects of the crisis. In the end, we seem likely to spend a very large sum of public money (so far the commitment is £3.5 billion) to very little effect. The real issues (which are mainly about food policy and animal and human health in the UK, because this is where the crisis has struck) have somehow become secondary.

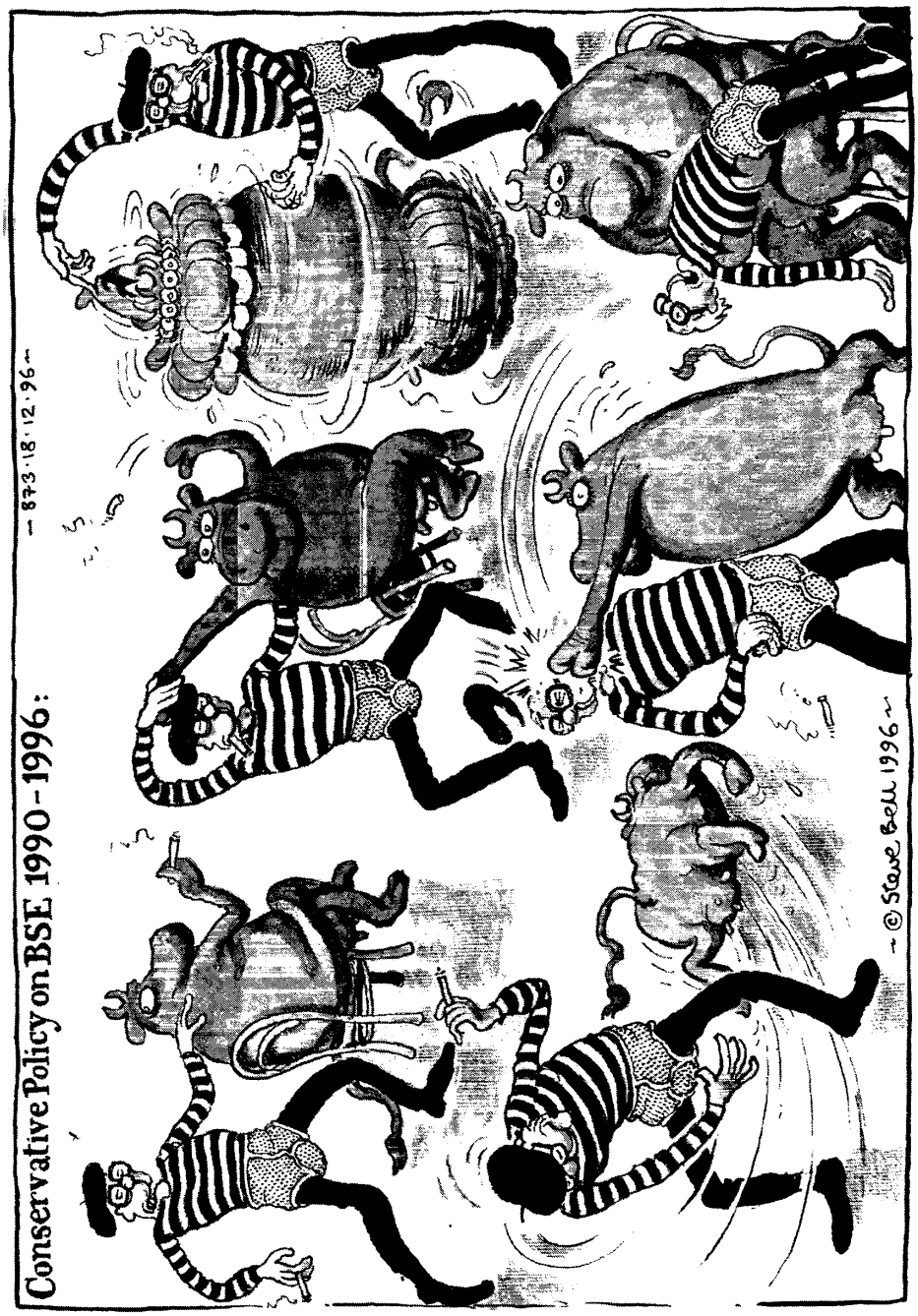
The European dimension

One of the worst parts of the handling of this crisis is the European dimension, and the damage done is likely to be lasting. Britain is in two minds about whether it wants to be in the Union, and often seems to extract minimum benefits from its membership while causing maximum aggravation. The BSE story has been a glaring example (Box 17).

It ought to have been clear when the crisis struck in March 1996 that the European dimension of policy had the potential to be at least as difficult as the domestic, and that the UK needed all the help that it could get from the Commission. Yet rumour has it that Franz Fischler, the Agriculture Commissioner, had only half an hour's warning before the Commons announcement. Moreover, Douglas Hogg attended a meeting of the EU Agriculture Council on 18th/19th March and did not take the opportunity to have a private word with Fischler. Quite right too, many British MPs would say. The fact is, however, that the news was bound to precipitate a crisis in Europe as well as in the UK, which we had to take seriously. If 'eurosceptics' are unimpressed by arguments about the potential danger to European unity, they should at least recognise the dangers to Britain's economic interests, starting with the ban on beef exports. Assuming it to be true that Herr Fischler had so little warning, and had no time to be involved in the policies to be announced, it seems downright silly not to have given him any chance to contribute at that stage.

Although British farmers may blame the Commission for the ban imposed on 27th March on all beef and related British exports, action of some kind was inevitable from the start. By

Box 17



Steve Bell cartoon
Source: *The Guardian,* 18th December 1996.

that time all the 13 Member States – not, it seems, given any warning by the British Government – had imposed their own national bans and their domestic beef markets were in tail-spin.

British Government policy towards the rest of Europe seems at that stage to have become seduced by the temptation to play domestic politics. One can readily understand how great the temptation must have been. After all, a number of members of the Cabinet were eurosceptics, as is a substantial proportion of Conservative voters. What is more, the scepticism crosses party boundaries and extends across the political spectrum. Virtually nobody loves Brussels. How tempting, therefore, faced by the BSE crisis with an extraordinarily difficult hand, to try to turn the European Union in general, and the Commission in particular, into the enemy.

However expedient (at least in the short run) that may have been domestically, it was disastrous on the European front. We needed the Commission's help, and we had to try to persuade our European partners to minimise the damage to British interests. If there was any goodwill for us anywhere, or any potential allies, now was the time to mobilise them. Instead of which our Government's crusade to lift the ban, followed by its policy of non-cooperation in all routine business when it felt that others were procrastinating, caused maximum outrage at the most sensitive time. Popular as the policy may have been at home, it was seen as totally unjustified in the rest of the Union and in the Commission. The damage done by it will be lasting. For many powerful people it has confirmed their view that the only way to deal with British obstructionism is to press ahead as fast as possible with political unity, without Britain.

In the end, the Florence agreement appeared to offer a way forward towards a gradual lifting of the export bans, sufficient at least to get the UK Government out of the cul-de-sac of non-cooperation. Again, however, Britain has not made the best of what was on offer. As recognised in the previous

section, the selective cull that forms part of the agreement has little to commend it scientifically. Its merit is solely that it sets out an action plan that then – provided Britain complies with it – enables the Commission to put forward proposals to lift the bans step by step. Although there is no guarantee and no timetable, Britain's bargaining power is strengthened each time it complies with the requirements of the plan. That being the case, the best tactical move was simply to get on with it. (The Swiss, incidentally, who also had a beef export problem, although on a much more modest scale, have played their European cards far more skilfully than the UK, by taking action before they were pushed.) Instead of which, we have procrastinated, so that the scientific basis for the actions agreed at Florence look shakier and shakier, and it may prove difficult to convince anyone that the terms of the cull have been met, even when far more cattle than the 140,000 required have actually been destroyed.

Farming and food policy

Something has gone seriously wrong with our food policy, and one can see why. As consumers we want cheap food. Indeed compared with the Germans or the Dutch, we seem bent on food bargains, ahead of concerns about quality. We appear to have come to assume that anything on sale is safe. By now we ought to know better. *Salmonella* in eggs (1988), *Listeria* in soft cheese (1990), toxin in apple juice (1993), traces of phthalates in baby food (1996), *E. coli* in beef (1996) are all serious instances of food dangers, quite apart from BSE.

Consumers want cheap food. Farmers want high yields, and are sometimes not too scrupulous about methods. Farming is presented as a mass-production industry, where intensive methods pay. Domestic and European government policies have, at least until very recently, encouraged maximum outputs. The food processing industries, from the abattoirs onwards, vary in their standards from the scrupulous to the reckless. Regulation is inadequate to the task of catching those

who (however unknowingly) are putting human health at risk, whether on farms or in the supply chain from farm to table. The culture often is one where not being caught by some tiresome official is the standard, rather than full compliance with regulations, the reasons for which are understood and accepted.

It is encouraging that a number of the large food retailers are putting quality high on their agendas, and taking steps to turn the rhetoric into reality.[42]

Farming, food policy and diet are among the most important influences on our individual and collective health. It is time for us, the public, to take a serious interest in the quality of our food and the methods by which it is produced. Quite apart from our own health, we ought not to forget the sordid realities of turning ruminants into unwitting cannibals, and of 1.3 million cattle destroyed in the past 12 months – not for human food, but to form a disgusting and embarrassing monument to human folly.

It is time for public opinion and Government policy to insist that food policy is more risk-averse and that the incentives are towards more healthy forms of farming. We must accept the reality that our food will consequently cost us more. As Professor Hugh Pennington said in launching his report on *E. coli*, the public will have to pay 'significantly more' for food in future to cover the costs of the safety methods needed to lessen the risk of contamination, such as slower production lines in abattoirs to allow carcasses to be cleaned properly. He warned that the extra cost of food in the shops could be between 10 and 50 per cent.[43]

All in all the story told here is not a happy one. It is, of course, not by any means ended. We simply have no way yet of being certain about the scale of the human tragedy, as distinct from the appalling waste of animal life. All we can say with assurance about the incidence of new-style CJD is that the longer that further bad news is delayed, the better.

Although it will be a long time before the story ends, it is not too soon to begin to discuss lessons. That is what this monograph has tried to do. There are four clear messages. First, that on its record MAFF cannot be trusted on issues of food safety. Second, that there is a lot of thinking to be done about the interplay of science, policy and politics, particularly over uncertainty and risk, not only in the UK, but also at the European level. Third, that the European dimension of UK policy was singularly badly handled, largely because we chose to play UK politics on the European scene. And, finally, that we need a green revolution in British farming and the British food industry, and we must be prepared to pay for safer food with higher prices.

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