

THE BSE INQUIRY

This statement is submitted by Dr Alan Long on behalf of the Vegetarian Economy and Green Agriculture (VEGA).

Thou never didst them wrong, nor no man wrong;
And as the butcher takes away the calf,
And binds the wretch, and beats it when it strays,
Bearing it to the bloody slaughterhouse,
Even so, remorseless, have they borne him hence;
And as the dam runs lowing up and down
Looking the way her harmless young one went,
And can do nought but wail her darling's loss;....

Henry VI, Part 2, Act III, lines 209-216

1. Status and Interest

- 1.1. I am an Honorary Research Adviser and formerly Research Adviser of the Vegetarian Society of the UK.
- 1.2. I collaborated in the early 1970s with the RSPCA on its Stop Live Exports campaign, which secured a ban that held for some months.
- 1.3. We helped with intelligence gathered by the Sunday Times on the activities of a sheep exporter, who was subsequently found guilty on 9 charges, but had fled the country before the case came to court.
- 1.4. We helped the Sunday Times in investigations of CAP frauds and traffic in illegal drugs (as growth boosters for livestock, as well as for human body-builders) in Ireland. The illicit dealings were suspected as being sources of funds for the IRA. Vigorous official action has ensued since.
- 1.5. In association with the League against Cruel Sports and the Sunday Times, VEGA's investigations of disposals of fallen stock, hunt kennels, and sales of knackered and condemned meat and offals, revealed various forms of illicit trading. Inspectors from the Inland Revenue completed the investigation and its corollaries.

- 1.6. I acted as an expert witness for the defence in the “McLibel case”. Although the defendants lost, the judgment looked favourably on the evidence adduced on their behalf on animal welfare.
- 1.7. Our volunteers have been market watching in an organised way since about 1984. These activities, complementing intelligence from farms, slaughterhouses, and rendering plants, have concentrated for logistical reasons on livestock marts and auctions in Surrey, Sussex and Kent and in the southwest, and have offered much experience in the workings of the live/deadstock industry, particularly in movements and dispositions of cattle (especially dairy cows and calves) and sheep. Our efforts complement and extend the functions of RSPCA inspectors and any officials of the auctioneers and local authorities and MAFF who have given responsibility for animal welfare; they have been augmented latterly by Animal Aid, who have amplified reports with videoed evidence brought to the MAFF's attention of harm inflicted on the animals.
- 1.8. Evidence which I obtained at visits to Southall market of illicit sales of drugs led, after the accusations were pursued by the Royal Pharmaceutical Society, to prosecution of a vet, who was subsequently struck off.
- 1.9. I was commissioned about 15 years ago by the government appointed Farm Animal Welfare Council to direct scenes in its training video on the marketing aspects behind supplies of meat and dairy-products. We shot the film at Guildford livestock market.
- 1.10. VEGA has submitted testimony to the Farm Animal Welfare Council, which has reported recently on the treatment of the dairy-cow. VEGA has also sent comments to MAFF on the proposed Food Standards Agency, both at the stage of the initiating James report and of the later drafting of the White Paper.
- 1.11. VEGA is funding research at Bristol University on pre-slaughter treatments of cattle and on the age at which a calf is fit for removal from its dam.
- 1.12. We have been and are involved in or initiating and funding epidemiological research in universities and hospitals on diet, nutrition, and health. Results from these studies are published in refereed journals.
- 1.13. I am qualified as an organic and biochemist, and worked for many years in these disciplines as a researcher in the pharmaceutical industry, latterly with special interests in anti-infective products (ie to combat bacterial, viral, and fungal diseases). I am a Fellow of the Royal Society of Health and a Fellow of the Royal Society of Medicine. In the 1970s I was running for fellow researchers lectures by invited speakers, one of whom was Dr Richard Kimberlin, who spoke on the subject of scrapie. My more recent knowledge of encephalopathies is refreshed by my continuing ability to keep a steady squash opponent and acquaintance who is doing research in amyloid disorders of the Alzheimer type.
- 1.14. We indicated at the outset that we wished to testify at the BSE Inquiry, and I contributed comments at its public launch, on 27 January 1998 (see **IAI Tab 12 page 24C but unattributed**).
- 1.15. We have accumulated and disseminated evidence on BSE in various ways.

- 1.15.1. From discussions with farmers, vets, transporters and other animal handlers, mainly on the ground. We have also made visits, some in disguise, to slaughterhouses, knackers' yards, and rendering premises.
 - 1.15.2. At scientific and medical and veterinary conferences. Opportunities thus arose also for informal discussions with experts in the relevant issues.
 - 1.15.3. At press conferences, where the exchanges were at a different level but often useful.
 - 1.15.4. In furnishing press and other media with material for articles and programmes and in engaging contributors with useful knowledge and testimony.
- 1.16. VEGA is a registered charity, with no commercial interests; nor have I.

2. Survey

- 2.1. Dairy cows are under considerable stress, and premature, physiological and anatomical breakdown is common. Staggers, downers, and spreads are colloquial terms for conditions brought on, with pathognomonic seasonal and dietary variations, by exhaustion, misery, disease, and injury. However, we learnt in the mid-1980s of a version in dairy cows whose symptoms were abnormal, although at first they might have been confused with listeriosis (a bacterial disease).
- 2.2. Farmers and their vets began early on to associate feedstuffs with the trouble. This is not surprising because rations for dairy cows are variously "enriched" under the pressure for higher yields, and changes in performance and behaviour are quickly detected, even as intensification increases and stockmanship declines. Until the MAFF's interpretation apparently clinched a number of matters, a silage additive was under suspicion, and elements in the rendering industry tried to attach the blame on the increasing inclusion in the rations of rapemeal. The MAFF's explanation was easy to comprehend, but the other factors may have been contributory and their importance has not been fully assessed.
- 2.3. Farmers had been ignoring for some time warnings on the lack of information on contents of the feed bag. Nor were only they negligent: our warnings to "foodies" that food should connote feed (and water) - as in the plow-to-plate considerations now so popular in the proposed Food Standards Agency - went unheeded or suppressed.
- 2.4. Our earlier reservations and testimony sprang from objections to feeding farm animals with hi-protein meals of animal origin. Several outbreaks of botulism in cattle had been traced to inclusion of DPM (dried poultry manure) in feedstuffs. In the 1970s and early 1980s this practice was actually commended. The botulism occurred because the carcasses of dead birds in the litter and manure became sites of anerobic fermentation. Transmission of salmonella was a persistent problem too.
- 2.5. British cows kept prudently on grass, fresh and conserved (as hay or silage), would have been yielding about two-thirds of the output achieved by additions of dubious concentrates. Such husbandry is practised more widely in "our" latitudes in Ireland and New Zealand.

- 2.6. Imprudent intensification of British milk-production was a harbinger of trouble. In the 1980s after a steep rise over the preceding decade average yields from the dairy cow were approaching 6000 litres (6 tons) of milk a year, and she was simultaneously gestating and giving birth to a calf. She was thus producing 6 times or more the output of a cow in the purely beef herd, suckling her calf to weaning in a less forced way. In human terms this could be translated into an output from a pregnant wet-nurse to breast-feed 6 or more babies for a year, ie yielding over a gallon a day. The heifer would be put in calf before she had developed fully. By the 1990s some British herds were boasting of a near-doubling of the average yields with 10-ton cows.
- 2.7. The average dairy cow was therefore an engineered freak, susceptible to a variety of "production diseases" as a result of which - and owing to fluctuations in the market (eg due to the workings of the quota system) - she was a candidate for culling before she could complete 4 lactations. Her meat went mainly for manufacturing, eg for burgers. Many of the cows were so emaciated that extra fat had to be added in the manufacturing of patties, burgers, sausages etc. Offals (eg the pluck, tripes, intestines, udders, heads, glands, tallow, and blood) were used in the manufacture of foods and feeds, pet foods, glues and sizes, fertilisers, and medical products. The trade counted these items as a source of income from the 5th quarter, which was rendered during the vicissitudes of the BSE epidemic from a useful perquisite to a loss-making nuisance.
- 2.8. Rearing of sheep and the production of sheep-meat and exports of live animals have also been intensified in recent years, under the influence of CAP policies and subsidies, which have favoured the UK as Europe's main producer of sheep. Over the last 15 years the output of sheep meat in the UK has risen by about a quarter to 350,000 tons, latterly dropping back from a peak of 385,000 tons in 1991, representing a nearly 40% rise from the level in the early 1980s.
- 2.9. During this time the French suffered a parallel turn of fate, when they had to admit to outbreaks of trichinosis in consumers of horse-meat. Trichinosis is a text-book example of a zoonosis confined to carnivores. The horses and meat were being imported from North America and the French deduced that the horses had been fed on products such as MBM. It seemed likely that some of the horses had been kept intensively to yield urine rather than milk for the production of hormones used in medicaments (eg for hormone replacement therapy) and in inducing estrus and birth in farm animals.
- 2.10. Strong evidence in the late 1980s from the MAFF implicating feed in the spread of the new disease stimulated our warnings over the corollaries of zoonotic feed- and food-borne diseases. These led us to persist in inquiries and warnings based on the following considerations, to which I add detail of the attention they received.

3. If feed is so strongly implicated, remaining stocks should have been urgently confiscated.

- 3.1. This measure was rejected as "extreme" and prohibitively expensive. Labelling of feedstuffs had been condemned for some years as inadequate, and compounders and farmers had not budged in attempts at raising standards. A few years before 1988 we had exposed a "chocolate" milk replacer for calves that contained dried blood. Over all these years we have warned North American authorities of sales of similar products containing "animal plasma" or "animal protein", and their withdrawal is only now being contemplated.
- 3.2. Precedents in tracing sources of drug residues in meat and milk and stricken animals were well-known to students of animal husbandry. They involved carry-over from batch to batch in the mill or confusion of products intended for different species. Stock control on farms was often poor, bins were sometimes not exhausted before a new batch was dumped on the remains of the old, and feed was scattered and consumed by thieving and opportunist animals. Lorries were not routinely cleaned between loads. I had met a farmer who assured me that dairy-cake was tasty and good enough to eat - which he did as proof. Lingering amounts of contaminated material were belatedly blamed by farmers and MAFF officials for BABs (cases of BSE born after the ban on certain feeds); these statistics reveal disregard of warnings that we and others uttered at the time over distribution and dispersals of feedstuffs and the need for urgent confiscation of suspect materials. In an exchange at a meeting with Keith Meldrum (Aug/Sept 1992), the MAFF's chief vet, I cited evidence from research commissioned by the Ministry of the persistent parallel difficulties in ensuring that orders intended to reduce the carriage in proteinaceous feedstuffs of bacterial pathogens were carried out. The message in this warning was dismissed. It was pertinent at the time as an indicator of further perceived risks to consumers animal and human, because exposure to dusts could have spread the dangers in ways other than or complementing consumption (Sections 4 and 11).
- 3.3. In a further exchange with Keith Meldrum (Aug/Sept 1992) we reached agreement over probable undesirability of burials in the manner to which farmers had been accustomed with cattle struck down with anthrax. For one thing burial with quicklime to reduce contamination from these persistent risks seemed unapt and possibly added to the dangers.
- 3.4. I could understand at the time MAFF's reluctance for rigorous withdrawals and confiscations of feedstuffs because questions of compensation for afflicted and fallen stock, as well as of suspect cases, were looming; and the further destruction of carriers and contacts of BSE - as practised on affected herds in other EU countries and latterly in different ways in UK - presented MAFF officials with daunting reflections on the appalling scenes of destruction and cost in combatting foot-and-mouth in the 1960s. Indeed, one MAFF vet added to me his reservations that the new disease in cattle could be traced - like EBL (enzootic bovine leukosis) - to subsequent restocking of the national dairy herd with animals of more pronounced Holstein genetics. Commercial pressures in the dairy/beef/veal industry and the popular and political clamour for cheap food brooked no drastic but prudent measures when BSE succeeded foot-and-mouth, and critics who were already vegetarian received short shrift when they tried to spell out the contemporaneous issues.
- 3.5. The MAFF's restrictions on sales of specified risk materials, in the ingredients of both feed and food, were imposed with greater urgency than curbs on the spread of compound feeds, but the MAFF's underestimation of the hazards and its commitment

with the live/deadstock industry allowed a lamentable transmission of risks. I would add that consumers' organisations accepted the stipulations of the MAFF and European organisations that could be implemented without stringent reductions (at least temporary until corollaries had been followed through) in the consumption of meat and milk (and possibly of poultry, eggs, and farmed fish; it is possible that suspect batches of feed have reached these species, whose lives are so short that overt beginnings of encephalopathies would be missed and pathological investigations missing).

- 3.6. At the moment about 171,000 confirmed cases of BSE in cattle have been reported, of which just under 36,000 were born after the ban on ruminant protein in cattle feed. The MAFF's throttle on the epidemic and surmises on the period of incubation are, in particular, shown to be uncertainties still.

4. Incidence of Infection. Dose Response.

- 4.1. Experience of feed- and food-borne infections generally indicate a high hit rate among consumers of a batch of suspect food, as well as an approximate proportionality between the quantity eaten and the severity of the symptoms. These factors assist in tracing the sources of the harm. They can be amplified or confused by "person-to-person" transmission (the oral-fecal route) or, especially in vigorously reproducing species, by the maternal (dam-to-offspring) route; carriage of infection may also occur from dusts, aerosols, or injuries, particularly noticeable in handlers of animals and feeds. Good precedents existed with the onset of the BSE epidemic. Maternal transmission of scrapie occurs (via placental afterbirths).
- 4.2. Our intelligence and enquiries of MAFF early in the BSE epidemic yielded uncertain evidence and debate, although we learnt retrospectively of the MAFF's concern over these matters. Incidence was widely disseminated, but within-herd cases ran at a low level, which was surprising if the Ministry's explanation was unique: the problem appeared to originate in the dairy-herd, which was understandable for many reasons, but the casualty-rate within herds would have been expected to be more concentrated than, say, sporadic outbreaks of food-poisoning, because the cows in any one herd were all eating diets with small variations. Anecdotal evidence, later reinforced, indicated a low or negligible rate of maternal transmission. However, some form of dose-response emerged as the MAFF yielded epidemiological evidence on incidence and traced batches of feed, for instance, in the comparison of the outbreaks in Guernsey and Jersey. Otherwise, we were left to assume that feeds had not been mixed to homogeneity. If this were true, it represented bad practice. Heat treatment may also have been patchy.
- 4.3. However, we could not rule out the play of factors ignored or denied by MAFF. As with scrapie, genetic susceptibility may vary in cattle among breeds, but we could elicit no indication of this among dairy-herds. The possibility remains. Cows maintain a bunt order in herds: the top cow establishes her ascendancy at communal feeding and the animal may have some opportunity to pick and choose in poorly-mixed feeds, possibly to her detriment.
- 4.4. Our earlier interpretations implicating ancillary factors also remain unsettled. They needed better appreciation from the outset.

5. Possible Accessory or Alternative Factors

- 5.1. We drew analogies from the knowledge of zoonotic diseases as the connection with feed was developed; accordingly, I wrote a survey in 1989 for the National Food Alliance. School biology illustrates a familiar example of sequential and cyclic transmission in the liver fluke (fascioliasis). Malaria offers a useful parallel: spread could be inhibited or prevented by deterring mosquito attacks, killing the insects, or draining the swamps where they breed. Any one intervention could break the chain, but the combination of factors must be disrupted for eradication.
- 5.2. Tick-borne zoonoses are well-known and are affected by rises and falls of populations with fluctuations in the weather. Lyme disease (borreliosis) was a tick-borne disease increasing as BSE waxed; it is a bacterial infection transmitted by the ticks that also carry a flavivirus causing louping ill, an encephalomyelitis resulting in bizarre behaviour, in sheep. Could such insects transmit an infectious agent causing spongiform encephalopathies and thus regulate transmission by their ability to bite their victims (and inject their cargo of infection into the bloodstream, by-passing the protective mechanisms of the digestive tract)?
- 5.3. Dairy cows suffer a variety of bites and injuries, as do their handlers and killers, especially in slaughterhouses. It turned out subsequently that carnivores such as cats had begun to suffer spongiform encephalopathies, which were not confined to herbivores-turned carnivals, and MAFF could offer no information on the spread of the BSE organism; nor can they offer much more now, although a report has appeared in the meanwhile over carriage of the infectious particles by haymites. Detailed investigation of the cats' origins and diets appears not to have been done or not to have been published. The pet-food industry made changes in its supplies in anticipation of regulations from MAFF, but doubts remain over the foods and prey consumed by cats, especially in feral states.
- 5.4. MAFF's apparent disregard of some of these threats may have been fortuitous, for the incidence of CJD, among handlers of animals live and dead, is not yet disproportionately high; however, the all-important statistics on the nv-CJD are still inadequate for conclusions.
- 5.5. Accessory factors have not been invoked in outbreaks of apparently diet-related transmissions of SEs in other species, eg people, mink, and certain zoo animals.
- 5.6. Discovery among the victims of nv-CJD of a young woman who had been a lacto-ovo-vegetarian for about 12 years was interpreted as a clue that the risky period for consumers of beef should be pushed back to before 1986. However, this view overlooks the possibility of transmission through dairy-produce and/or by contact with animals (we understand that she was a pet-lover). Carriage of bacterial and protozoal disease in this fashion is common and can be dangerous, but it is assumed that many viral diseases in animals do not jump species - and it is all too easy to attach to prions the label of slow (or near-) viruses. In farming terms foot-and-mouth and many bovine and ovine (and caprine - goat) viruses exemplify infections that do not afflict human contacts, but rabies, cow pox, orf, influenza, butchers' warts and HIV are some that are picked up by people from animals - and may be acquired by animals from people. Vaccines comprise viral material supposedly inactivated or attenuated. Administered products may also contain

antibacterial substances and biocides (eg certain mercury-containing compounds) and adjuvants with various effects on the immune system.

- 5.7. Possible transference by insects or vermin assumed another significance from information I extracted at a meeting on 17 November 1992, attended by MAFF officials, of the Society of Chemical Industry, where various aspects of crop-storage were under discussion. In the course of the lecture the MAFF official commented that a batch of feedstuffs condemned because it contained MBM had been stored in a bin in the confines of a mill producing feedstuffs intended for legitimate sale. No defence was offered to rebut my condemnation of the risks thus run of cross-contamination. The Ministry can now test routinely for animal protein in feeds but the facility doesn't extend to detection of the infectious agents of scrapie nor BSE. It is urgently needed.

6. Stresses conducive to lowered immunity and resistance to disease.

- 6.1. Slow virus diseases have been acknowledged for some time and the infectious particle implicated in the TSEs had been accorded some semblance to a virus (as a virino, for example, to those who jibbed at calling it a prion). Multiple sclerosis, diabetes, and the common cold sores are diseases with suspected or proven consequences of viral infections acquired some years before the sequel manifested, probably - as is aptly exemplified with cold sores - by some stress, which might be erratic or overlooked. Post-viral fatigue seems to be a more recent disorder of this type.
- 6.2. In our exchanges with the MAFF experts and spokespeople early in the BSE epidemic we reminded them also of various auto-immune reactions, many delayed, that were and are thought to be corollaries of earlier infections with enteric or sexually-acquired infections by bacteria of the *Campylobacter*, *Clostridia*, *Shigella*, *Yersinia*, *Salmonella*, and *Chlamydia* species, which are common to animal and human populations. In people, especially in the so-called HLA B27 sub-group, the later manifestations were classed as forms of seronegative polyarthritis, which extended beyond reactive arthritis and certain eye disorders to likely examples in types of inflammatory bowel disease and neuropathies such as Guillain-Barre disease.
- 6.3. Relevant stresses on animals and human carriers of prions might therefore enhance the risks of spread and development of spongiform encephalopathies, even if the injuries and insults to welfare were not immediately obvious.
- 6.4. Among other factors in this category that occurred to us with medical experience and interests in animal husbandry were:
- 6.4.1. **Post-immunization debilitation.** Shortly before the outbreak of the BSE epidemic a number of ewes had gone down after administration of a polyvalent vaccine (heptavac). At such times sheep, especially in extensive systems, suffer a number of stresses, including administration of other drugs, during the brief period between the round up, collection, and sorting, and return to the grazings. Adjuvants may be added to the vaccines. Such multiple insults to the immune system are avoided in medical practice to reduce the possibilities of opportunist infections.

6.4.2. **Toxic or immunomodulating drugs or contaminants.** In discussions with MAFF we tried to draw attention, without much success, to the following causes or contributory factors in the BSE epidemic:

6.4.2.1. **Mycotoxins.** Feeds kept or from crops contaminated in certain conditions develop fungal toxins recognised as causes of illness and death in consumers of various species, including people; human consumers may be at risk from milk, meat, and eggs derived from animals fed the dangerous rations. Ergot, aflatoxins, ochratoxins, and trichothecenes have been traced as potent poisons in this category and responsible for epidemics of illness and death. MAFF dismissed this factor as implicated in outbreaks of BSE, without firm assurances that these hazards were not involved.

6.4.2.2. **Caramelization and Maillard reactions in meals** Farmers and feed-merchants have adopted treatments of carbohydrate-rich feeds with ammonia or urea to improve their effect in promoting growth in the livestock. Heating of carbohydrate with proteins or some other nitrogenous compounds causes chemical ("browning") reactions of the Maillard and caramelization types, with varying nutritional and toxic consequences. Experiments with ammoniated straws and with chemicalized caramels had been known to cause intoxication and death in animals, and neurotoxic components and causes of leucocytopenia had been identified. Further, the heating and charring of muscle tissue (a source of creatine), such as occurs in the meat offals and fish used to make meals, generates carcinogens of the heterocyclic amine type. Again, MAFF gave us no assurance that it was entertaining these factors as causes or contributors in the BSE epidemic. Subsequent restrictions on feedstuffs do not remove all the hazards that we raised for discussion on these possibilities.

6.4.2.3. **Hormones, Growth Boosters, etc.** During the 1980s and early 1990s farming practices with these compounds changed. Five steroid or steroid-like compounds were withdrawn in the late 1980s from use in European practices intended primarily to beef up calves, bullocks, and cast cows. Steroids (eg follicular stimulating hormone obtained from pregnant mares' urine) and prostaglandins were being used to synchronize estrus and birth in cows and ewes and thus to reduce staffing and the need to run male animals for "service"; a product was being introduced to raise the fecundity of ewes, with adverse results as it turned out, and it was withdrawn; use of the hormone melatonin was also being introduced with the aim of advancing lambing to catch the profitable spring market.

6.4.2.3.1. Increasing unrest has attached to the use of powerful drugs, advertised to farmers with bargain offers, for the purposes of boosting growth and output (so-called in a euphemistic touch as digestive or performance enhancers) and of preventing the diseases constantly threatening intensive farming (ie used, sometimes in continuous low

doses, prophylactically, rather than therapeutically and individually in cures administered in the precept of good practice, with appropriate nursing care). Mass medication is now termed metaphylaxis and the enterprises selling the drugs style themselves the animal health industry.

6.4.2.3.2. Since the Swann Committee's report in 1970 (the last of a series of official investigations commissioned during the 1960's on the use of antibiotics as growth and production boosters) much concern has attached to the spread of "superbugs", acquiring resistance to valuable antibiotics used to treat diseases in people, animals, and fish, and frequent warnings about misuse have been uttered to doctors and - with scant heed - to vets, farmers, and their clients. We can exemplify doubts now concentrating in this context on avoparcin and virginiamycin. Antibiotics lower or otherwise compromise immune processes and they unspecifically destroy populations of benign bacteria, allowing ingress of undesirable pathogens, bacterial and fungal. Avoparcin has been used in some countries in Europe (including the UK) as a booster, but not in N America. The UK alone in Europe has opposed calls for a complete EU ban on veterinary use of avoparcin. These facts and their like give cause for concern of the type devoted to the OPs, but they have been ignored.

6.4.2.3.3. I have failed to elicit evidence that these changes worked for better or worse in the context of BSE, although they are relevant to the stresses and immunological insults.

6.4.2.4. **Toxic Weeds.** Changes in flora may work their way into effects on forages, feeds, and foods and they may denote intrinsic toxicity, rather than contamination with mycotoxins or contamination with residues. Grazing and browsing in fields where groundsel, or ragwort or rhododendrons or yew trees are present or of easy access is known to intoxicate ruminants in the UK. Excessive consumption of clovers can upset grazing livestock and cause bloat. Seasonal changes may affect the flora and result in further consequences.

6.4.2.4.1. Precedents exist in human consumption of toxic effects consequent on climatically-induced alterations or on war-time exigencies. Lathyrism is a neurological intoxication in countries such as India when tares (a vetch) survives over wheat in times of drought; and resort to cycad nuts as foods in beleaguered Pacific islands during World War Two caused disturbances in the brains of the consumers.

6.4.2.4.2. The Bible contains references to scourges, plagues, murrains, and epidemics that are probably of this type and may have informed ritual practices in agriculture and diet

described particularly in the Old Testament. However, we can discern no similar factor as a main cause nor accessory in the British pastures and feedstuffs of the 1980s, although we are not satisfied that botanical clues have been followed up fully.

6.4.2.4.3. Consumers of meat, milk, honey, and eggs may report flavours attributable to changes in pastures or feed that come through to the final product. They may be appreciated as herby nuances in livestock reared in spring pastures or fishy taints as off-flavours in eggs and milk from animals fed a lot of rape- or fish-meal.

6.4.2.5. **Pesticides.** Residues in feeds could cause harm and/or drugs used as growth boosters or therapeutically could cause or contribute to neurological or immunological disturbance. We emphasised at the outset the significance in this respect of the following agents; we also drew attention to possible differences between technical grades used in farming and pharmaceutically specified versions used in toxicity testing and medicine, impurities being responsible for the main adverse effects.

6.4.2.5.1. **Levamisole.** This anthelmintic, widely used by farmers for worming ruminants, is cautiously used by doctors because it is an immunomodulator. It seemed to us possible that its use could alter the resistance of sheep and cattle to infective agents. We received from MAFF experts assurances that this factor could be excluded; their evidence has not been published.

6.4.2.5.2. **Organophosphorus compounds.** These have been used widely - indeed compulsorily for a while against sheep scab and fly-strike and warbles in cattle - to treat ruminants infested with insects. Some of the compounds are used in stores of grains and potatoes. They also find some medical applications. Their relationship to nerve gases used in warfare and experiences of workers involved with them, eg for sheep-dipping (as well as observations of the behaviour of the dipped sheep) emphasise their effects on the nervous system. Mark Purdey (see Section 9), has pursued this topic exhaustively. It was another factor dismissed by MAFF (albeit with a very recent change of mind). We have been concerned all through with the consequences in the care of sheep, for alternatives to the OPs are unsatisfactory in several ways, notably in cost, lack of effect against fly-strike - a very distressing condition - and in disposals of spent materials.

6.4.2.5.3. **Methyl Bromide.** This toxic soil sterilant (eg for greenhouses) has been incriminated, like the OPs, for harm to the immune systems of people and animals affected by

it. We have found no sound evidence of this credible suspicion. Methyl bromide has been condemned for other environmental reasons.

6.4.2.5.4. **Chaperonins.** While debate continues over the nature of the particle responsible for TSE infections, the unusual properties of proteins must be entertained, among them the need in some biological actions for an accessory - a chaperonin. This possibility has not been explored seriously enough in attempts at explaining the origins of BSE.

7. John Gummer's Ministry

- 7.1. The Food Safety Act of 1990 (**L 1 Tab 2**) showed the Minister of Agriculture in a vigorous reforming mood - so vigorous in fact that some subsequent deregulation has had regrettable results in the controls on food-production. At the end of the 1980s concern over food-borne disease and pathogenic bacteria, such as salmonellas, campylobacters, listeria and clostridia, was rife, and the Public Health Laboratory Service was acting - some would say nannying - with controls and prompting slaughtering-out policies.
- 7.2. Mr Gummer had also to contend with the persuasions of organizations such as ours, who examined the disarray in the live/deadstock industry in campaigning for our cause. At a dinner at Butchers' Hall in London given by the meat industry Mr Gummer departed from his script to deliver a warning that was reported by the Times on the 1st May 1990: that vegetarianism was an unnatural practice by biblical standards and that God had not created people, like cows, with 3 stomachs, to be vegetarians.
- 7.3. We pursued Mr Gummer on further occasions. At a subsequent ministerial visit to the Royal Agricultural Show (in 1991 I think) he was presented at the press conference with a trolley of the rich variety of foods on sale for the British shopper. We could gleefully point out to him that it was a meat-free cornucopia for a vegetarian customer.
- 7.4. During the ministerial visit to the Royal Smithfield Show in December in 1991, we arranged for a little vegetarian girl to waylay him with a Christmas present - a veggieburger - for his now-famous daughter Cordelia.
- 7.5. Mr Gummer was on record with discontent with the conditions in many British slaughterhouses and with the derogations that allowed some to stay in business. However, we consider that he and his successor neglected warnings coming from parties with a closer watch on practices at farms, feed-mills, livestock marts, slaughterhouses, knackers' yards, and rendering plants.
- 7.6. The BSE crisis exposed some lamentable curtailments in research facilities equipped with manifold resources to tackle the challenges in the epidemic. The derogations had weakened near-market research and were hampering services such as the PHLS. It seemed that the PHLS was an agency which MAFF wished to exclude from the BSE

investigations. I remarked on the relevance of the PHLS in studies on zoonotic diseases. Mrs Edwina Currie, a minister in the DOH had quoted only slightly inaccurately on the carriage of salmonellas through and from the poultry industry. The PHLS had been involved since the 1960s in investigating the usage of antibiotics in intensive farming and the spread of multi-resistant bacteria, especially salmonellas and associated particularly with cattle. It had much experience in tracing infections originating in feedstuffs and carried by the live/deadstock industry to the retailing and catering trades and finally to the human consumer. It enjoyed an international reputation and links with similar agencies, eg in North America.

8. The Lacey effect

- 8.1. Unfortunately the controversy which surrounded Professor Lacey's views fermented a feud of diminished service to the common good. It distracted attention from issues that needed careful and laborious debate. Its rancour entrenched the uncommunicativeness of Ministry officials and the contempt of politicians.
- 8.2. I was enlisted as adviser to several investigations for the media. These included a 3-part TV series, articles in the press and programs for TV. Nearly all were dominated as it turned out with cliches of the stricken, stumbling cow, John Gummer's offering to his daughter, and the Lacey dispute. Objective reporting was ousted.

9. The Purdey effect

- 9.1. Mark Purdey rejected the MAFF explanation, initially based on epidemiological evidence, that feed was the source of infected particles and he laid the blame on uses of OPs in relevant animal husbandry. He persisted even more vigorously than Professor Lacey in rejecting the Ministry's view and he disdained suggestions that OPs might be only accessories to the MAFF's explanation. We also followed the debate and arguments that were held - and with Dr Harash Narang, another objector - with the MAFF. During this time useful evidence emerged and contentions altered in consequence. Although we tried to draw the MAFF's attention to possible contributory factors, with precedents in zoonotic disease (Section 5), we remained convinced that the contaminated foodstuffs were entrenched in the explanations of transmission, possibly not in a unique role but in ways that did not require a complete understanding of the nature of the infectious particle (still a debatable issue).
- 9.2. VEGA does not take exception to MAFF's measure to deal with warbles in cattle. This pestilence distresses the animals (causing gadding) and lowers feed-conversion ratios. MAFF may have opted for biocides (at the time less dubious than now), but the proposition that a "natural" or "organic" (and variable) substance such as derris might have untoward long-term effects has not been adequately dealt with.

10. The Media

- 10.1. Treatment of the BSE epidemic found the media wanting. Issues were not explored in depth, questioning at press conferences was superficial and mainly aimed at heightening

controversy sensationally without affording the public an objective view of what was known, contended, disputed, and not known.

- 10.2. Questioning of experts on their own dietary practices and changes should have been pressed and answers volunteered, instead of being evaded as impertinent intrusions into private affairs. The MAFF was being bashed by critics without the commitment to declare cautious uncertainty and self-control over the changing utterances on safety.
- 10.3. Few of the media presenters, interviewers, and reporters got nearer to farming than the press room at MAFF, or a radio or TV studio, still less did they sit out scientific meetings to the questions and comments at the end. It was a different world for those of us who visited farms, markets, slaughterhouses, knackers' yards, rendering plants, and fishmongers from the descriptions or inferences implied in press handouts. If the feedstuffs were as dubious and ill-mixed as the MAFF's explanations indicated, much more probing of the appropriate industries required attention, especially when the farmers were in full cry for subsidies.
- 10.4. Curiously, information from vegetarian campaigners, plying their interest with no hidden agendas, received shorter shrift than tidings from compromised commentators. We were often called upon to explain practices in the food chain to reporters purporting to be agricultural correspondents, but we failed to generate from them clear accounts of the different systems of beef production in the UK, the rest of Europe, and North America, and the Antipodes.
- 10.5. The media failed to inform the public responsibly.

11. Distribution, Transmission, and Dispersal of the Infectious Particles.

- 11.1. Given the MAFF's theories on the transfer of infection from feed to brain, we had to depend on the Ministry's proscriptions of meat and organs to deduce the modes and routes informing its thinking. Absorption through the nose, skin, or cuts was not entertained or was dismissed in questioning, not convincingly, I thought. Dust was played down as a vector.
- 11.2. Transmission by ingestion was attributed, with some precedents in viral and bacterial infections, to the lymphatic and lymphoreticular system rather than through the arterial and venous blood that circulates nutrients and hormones and may become septicemic. The assumption that material transmission was unlikely allowed some questionable exemptions, eg the 6-month rule, which accommodated the veal trades and relieved the dairy-industry of surplus calves.
- 11.3. We tried to expose the arcane workings of the trade in the 5th quarter, in rendering, and the origins of various delicacies, some sold under foreign names. We could ascertain that many charcuterie products and offals served in restaurants, as well as veal, came from countries such as Holland and France, where the butchery was less crude; however, the veal could have originated in young animals exported live from the UK for finishing. In the UK most of the 5th quarter went into rendering and manufacturing trades and conversion into by-products for the food, pet-food, cosmetic, toiletry and pharmaceutical industries and even eyeballs for lessons in anatomy and surgery. We had to enlighten many enquirers on the sweetbreads, which may be the true thymus

gland (and thus part of the lymphoreticular system) of the calf, which dwindles as the animal ages. The false sweetbread is the pancreas.

- 11.4. The embarrassment of MAFF and meat-industry over ox-tongue was of a different nature. "Organ meats" and "variety meats" had been imported traditionally from the specialised slaughtering business in the USA, and producers in the UK of tinned ox-tongue lost almost all their supply of "blades" when the EU embargoed at the end of the 1980s imports of all products derived from "harmonised" cattle, which effectively throttled a supply of carcasses and offals just when replacements for proscribed British sources were being sought. The tongue has been exempted from parts of the heads excluded as risky materials.
- 11.5. Traditional barons of beef, like lamb chops, are butchered crossways rather than split down the middle of the carcass. Such cuts of beef infringed the earliest regulations on specified offals, and we discovered the meat trade resorting unsuccessfully with devices to gouge out of the spinal cord appropriately or to contrive imitations of the objectional cuts of meat. In these matters we found MAFF at that time trying to limit the risks to the industry's fortunes. It allowed sales of bone-in beef to continue (although accepting that it shouldn't be exported) and of ox-tail (dismissing our observations that the tail was innervated and represented an extension of the spinal column). Recently a new government has controversially disallowed these exemptions, on the basis of scientific evidence that should have been prudently acted on when the relevance was greater. We draw attention to the MLC's support, albeit reluctant, for the latest measures. Utterances from the NFU concurred immediately after the ban on bone in beef and oxtails, but the Union changed its tune when the political trends in the Countryside Campaign strengthened.
- 11.6. We ascertained early in the BSE epidemic that scientists and the Biological Standards committee had reacted over medical and experimental products quickly and unequivocally, in contrast to the delays and indecision over foods. Supplies from countries, such as the USA and New Zealand, in which scrapie and BSE were not identified, were used for the appropriate replacements. We emphasised many times to the press the comparative dilatoriness over food-supplies. One MAFF official admitted to me that one set of restrictions was delayed to allow that year's Burns Nights to be celebrated unrestrained. In some of these respects the pet-food industry seemed stricter than the trade producing food for human consumption in excluding suspect ingredients.
- 11.7. In our view MAFF was particularly tardy over its surveillance and attitudes over MRM (mechanically-recovered meat), a 5th quarter product used widely, like gelatin, in the preparation of meat-products, especially of the cheaper sorts, but often overlooked among the ingredients. Changes in labelling were slowly introduced and manufacturers realised that the MRMs had an ill repute and so began to leave them out of the ingredients. However, poor customers must have been put to the greatest risk and to one that can't be reversed. Again, MAFF and the meat-industry blanketed warnings that we and our likes were urging on vendors and customers.

12. Rendering and the Fifth Quarter.

- 12.1. Vegetarian campaigners had a long-standing and embarrassed interest in the conversion of the 5th quarter into a variety of by-products of widespread application, some of

which come within the purview of allied organisations such as Beauty Without Cruelty, which seeks in particular, alternatives for leather, hide, skins, fur, and tallow, glycerin, and stearine used for soaps, toiletries, and cosmetics. Some of these products, in different grades, find applications in foods and feeds, as well as in garden fertilisers, "organic amendments", photographic film, sizes and gums and glues with multifarious uses and greases, and as enrobing, encapsulating, and texturizing agents for foods, dietary supplements, and medicaments. Products such as gelatin may not be declared in lists of ingredients because they can be regarded as processing aids. Inclusions of mechanically recovered (or comminuted) meat might also escape a perfunctory examination of a list of ingredients. We were among the first to draw attention in a TV program to the processes and usage of "enhancements" such as MRM, and trading standards officers and other agencies have continued efforts at revealing inclusions of MRM, especially in "economy" versions of meat-products.

- 12.2. Fifth-quarter products find extensive application in pet foods.
- 12.3. Tallow, greaves, feather-and-bone and meat-and-bone meals, and DPM (dried poultry manure) and poultry litter have a long and recommended history of use in feedstuffs, albeit with risks from such products of transmitted diseases, particularly of spore-forming bacteria causing anthrax and botulism: for instance, poultry litter may contain bodies of suffocated or diseased birds, which are conditions suitable for anerobic fermentations.
- 12.4. Offalmongers and gland suppliers provide diverse products for pharmaceutical, cosmetic, and laboratory use. These sources are even more utilised in oriental remedies and tonics. If the pig offers its all, save for its squeal, for these multifarious purposes, exploitation of ruminant remains (cattle, sheep, goats and deer) can be nearly as exhaustive. Offals from poultry and fish-farming and harvesting, as well as from other livestock killed for food or skins and fur (rabbits, mink and fox), are turned to account likewise, and all may provide feedstuffs (eg for zoo animals and for maggots reared as anglers' baits and media for mushroom growing), or be disposed as "fertility enhancers" to the land (and thus percolate to water supplies) or they just present an environmental nuisance. Milk and eggs may also yield products of specialised commercial and medical importance. Human blood and organs are other resources exploited for various medically-important factors and they are likely, with animal-derived equivalents, to be in greater demand for these purposes as biotechnology advances, with enhanced risks of passage of, for example, CJD in its various forms and origins, by transfusions and transplants.
- 12.5. Blood, insulins, heparin, peptones, rennet, and lipases are the main extracts of animal glands and organs applied in the food and medical industries. Testicles, thyroid glands, horn, and bile are obtained for special purposes. Some old-fashioned remedies, such as neat's foot oil, crop up in traditional medication, for human and veterinary applications. These hormonal extracts and enzymes and nostra (which may contain many impurities) are derived from ruminant species among others; horse blood is used as a culture medium (eg for vaccines) and sheep's "brain and heart" and various peptones are included in the nutrient broths made into media for the cultivation of experimentally interesting "fastidious" bacteria. Opportunities abound for a spread of bovine proteinaceous materials. The human gut is leaky to some extent, especially in newborns, and transmission of infective agents through other means of ingress cannot

be ruled out.

- 12.6. Doubts over the effects of heat and other treatments in the preparation of tallows, gelatin, and glues delayed decisions over the acceptability of such products. MAFF tended too much to assumptions of safety based on the processes and inadequate knowledge of the infectious particle; these assumptions also overlooked subsequent contamination of sterile material by inadequate separation of clean and dirty areas and by staff in plants where I saw no signs that Hazard Analysis and Critical Control Points practices were being observed. Some of these structures apply to applications of these materials in further manufacturing. For instance, some were used to make tires and similar materials for belting.
- 12.7. I noticed some years ago when investigating the production of gelatin a shipload of bones from Pakistan for processing. I asked if they might contain human bones. This was accepted as a possibility. I enquired similarly a year or two later of an executive in a supermarket whom I'd discovered had once worked in a British gelatin factory. He too entertained the possibility of human bones in the consignments.
- 12.8. Charring bones to convert them into animal charcoal involves extreme temperatures, but the product is highly absorbent and is used to purify and clarify liquids, including potable water ("a little charcoal makes it sparkle", runs a jingle in the trade). Here again a risk from stable to table could be discerned, minute maybe but not negligible when a population of 56 million human consumers and several times more domestic animals were unwitting subjects in an uncontrolled experiment.
- 12.9. As far as I could ascertain, the rendering industry in the late 1970s comprised a number of small and failing enterprises performing nefarious and smelly "least-said-the-better" operations mainly in crude batch processes with disaffected workers in ill-managed plants. As with slaughterhouses piecemeal and headage payments reduced the care and skill of the operations. Equipment was often broken, unreliable, and untested, conditions were disgusting, and inspection (by negligent local authorities) very rare. Continuous processes were beginning to be introduced and the threat of monopolization loomed as Prosper de Mulder took over many of the smaller firms. Nonetheless, the meat-industry was content to soldier on with this nice little earner that paid enough for 5th quarter products to cover the cost of slaughtering and few questions asked.
- 12.10. Changes occurred more quickly as the BSE story unfolded. Shambles is the old word for slaughterhouses and yards and it nicely described the renderers' operations. Choice of suitable dyes to mark specified offals was delayed by various confusions, and accusations of monopolistic profiteering on the dyes were being bandied about in the slaughtering and rendering industries.
- 12.11. During the critical period when changes in rendering processes are suspected to underlie the survival and transmission of the infective particles, alterations were being made in the extraction of components of the mixtures, and adjustments were being made to the digestibility to enhance the ruminant animals' utilisation, particularly of proteins. These enhancements could have chemical consequences in the content of toxic factors, enzymes, and fibre. Some protein sources were "enrobed" or "encapsulated" for these purposes, possibly with animal fats or gelatin.

- 12.12. By-products of industries other than the meat-trade went, as available, into animal feeds. Some enhanced the palatability. Such components were and are derived from the baking, brewing, confectionery, sugar-refining, and dairy-industries, and may comprise damaged or out-of-date stock. I have seen remains of Mars bars, chopped with their wrappers on, in a batch of concentrate. Such inclusions aroused some concern because feed containing chocolate might be given to competition horses, who could then fail drug tests owing to the stimulating alkaloids in the chocolate.
- 12.13. MBM was introduced in early versions at the beginning of this century and has been a well-known proteinaceous ingredient for intensively-reared livestock, including ruminants, although the presence in feeds was not divulged during the 1980s in the exiguous information on labels on bags of feeding stuffs; neither were the other by-products described. It was recognised at the outset that ruminants and horses were not keen to eat MBM and its inclusion in the compounds is usually kept at 5% or below. Some of the other by-products (which may contain "E numbers" incriminated as causes of disturbed behaviour in young human consumers) countervail the unappetizing properties of the MBM.

13. From Whitehall to the Gut Room

- 13.1. Translating Whitehall writ into practice in the slaughterhouse was snagged by all the shortcomings in a ramshackle industry, many parts of which were verging on bankruptcy, with a workforce designated not so long before as practitioners of offensive trades. Slaughterhouses are no temples of technological excellence and the conditions are rough, bloody, and dirty; the premises serve as killing factories and latrines, as well as for the production of food.
- 13.2. We have followed the struggle to improve slaughterhouses. The Richmond report (**M 22 Tab 3**) reacted to the shortcomings revealed in the salmonella and listeria outbreaks and the need to reduce the need for derogations as EU disciplines for international trade began to bite. Its review and recommendations were acted on indifferently, and another survey by the Pennington committee was set up, almost superfluously, as the E coli outbreaks increased as the BSE epidemic progressed.
- 13.3. The Richmond committee laid the grounds for the Meat Hygiene Service, which was set up 3 years ago, to tackle some of the abuses. We have chronicled and publicised the problems in hygiene and animal welfare for over 30 years and we have won from the MAFF's lawyers access to detailed records from the MHS of reasons for rejections of carcasses and offals (as indicators of disease, injury, and ill treatment of the livestock) and Hygiene Assessment Scores (HASs) for named slaughterhouses and meat-factories. Results for these disclosures, now generally available, and the list of prosecutions, warnings, and other official interventions demonstrate the conditions in which instructions from Whitehall were interpreted as the BSE epidemic built up.
- 13.4. Customers have begun to take their complaints over food-borne infections to the courts, and supermarkets have intervened with their own audits and stipulations, if only to protect their own interest. It has however reinforced the efforts of the beleaguered MHS vets.

- 13.5. I reported my experiences in various guises of visits to livestock markets, slaughterhouses, knackers' yards, and rendering plants and feed mills. Some or most of such enterprises might be operating within one curtelage. Many animals arrived filthy and wet. Muck, which could include remains of feed and bedding mixed with excrement, coated them. Vets who tried to exclude such arrivals were on occasions physically assaulted and were threatened likewise when they tried to prevent other breaches of good practice. Any pre-slaughter cleaning of the animals might entail hosing down, adding droplets of soil to the steamy atmosphere and bacteria-laden aerosols pervading the premises. The hide trade complained of the damage to the skins, which were also devalued by abscessed injection sites after clumsy administration of drugs on the farm. Leather merchants and fellmongers had to rely on imports from foreign slaughterhouses for top-quality hides.
- 13.6. During my visits to slaughterhouses in the late 1980s and early 1990s I witnessed guts punctured and leaking during the dressing, digestive tracts inadequately sealed at the esophageal (weasand) and anal ends, and disposal of gut contents, which ranged from newly ingested feed at one end to manure at the other, into drains and, with offals including blood, into materials for spreading on land. In some places efforts were made to remove muck from animals about to be slaughtered, which were hosed down in a corner of the building, in one instance I saw with a high-pressure jet that was jolting the animals and adding to the pervading spray. Faecal material was spattered on some of the carcasses and workers, and stipulated procedures over disinfecting knives and other practices were not being observed, even by meat inspectors. Carcasses were being wiped with cloths used on a number of occasions, being cleaned only by immersion during breaks in a murky liquid in a bucket that looked eligible as a good culture medium for micro-organisms.
- 13.7. I observed removal of the spinal cords, which were pulled and picked out, leaving behind some of the spinous processes (later added to the list of specified risk materials) and specks on the carcasses. The channel was swept out with a wire brush, which was dropped to the floor when not put to this use and it wasn't washed during the morning's activities that I witnessed.
- 13.8. Until recently parts of the head could be removed by the butchers, but efforts at removing the brain were begun when the causes of BSE were diagnosed. I saw the severed heads swished out, with much splatter and spray, again with the ubiquitous high-pressure hose. It was difficult to associate these activities with the assurances and edicts issued from Whitehall.
- 13.9. Pithing is still a process used in Britain more than other countries in the slaughter of cattle. It is practised between stunning and sticking, to prolong and deepen the loss of consciousness after the initial blow. A captive bolt penetrates the animal's skull, makes a hole, and shocks the brain, producing a temporary stun (rather like a sock on the jaw). A rod shoved through the hole damages the brain still more and the pithed animal would probably never regain its senses. The clonic seizures that ensue are lessened, so the risks to the slaughterer moving in to make the mortal thrust are reduced. After death-throes lasting some minutes, during which 3 or 4 gallons of blood pour out of the wound, the animal dies, bled out. Although the heart's beating has ceased, muscles in the flesh continue to twitch for a while.

- 13.10. Contamination of the rod and dissemination of brain material seem likely to me. In many instances the rod is not disinfected between uses on a succession of animals and may be dropped on the floor. This process has been allowed without demur by MAFF - and is still defended by the MHS - although it seems an inauspicious way to convince home consumers and importers of the safety of the operation, particularly when parts of the head were being taken for meat.
- 13.12. Visits to slaughterhouses were from inspectors from MAFF, European authorities, and from the US Dept of Agriculture for premises supplying American forces in Europe (this trade was halted because of BSE and other reasons). News of the visits speeds through the premises and coded tannoy-messages emphasize the warning. The slaughter line is slowed and for a while some semblance of hygiene practice is observed. Latterly inspectors from supermarkets have been less easily fobbed off. For a time before the launch of the MHS 3 years ago deregulation was in vogue and veterinary supervision from farm to counter was being diminished. Discontent rankles among the staff of the MHS. Whatever is said and done, the process remains crude assault and battery and the niceties expounded by distant experts seem irrelevant.
- 13.13. Except possibly in Northern Ireland, the arcane dealings and haphazard practices in the live/deadstock industry precluded the tracking of food-borne diseases that good practice demands. Now, belatedly, traceability is being pursued.
- 13.14. Importers of British beef, livestock, semen, and embryos have good grounds for ruing their imports, as bovine products from the UK are regarded as suspect in international trade. However, we know of cases of BSE in, say, Switzerland in which any connection with UK is tenuous, if not absent. We have sought from the MAFF a closer analysis of the occurrence of BSE outside the UK and the clues that can be drawn. The familiar rumours circulate of under- and over-estimating through poor surveillance and that JCB disease in some countries is just cases of BSE buried on farm in some foreign land or, as in the UK, exaggerated reporting actually enhances the value of the livestock through compensations to the farmers, especially in countries where a single case entails slaughter of the whole herd (regardless in some instances of possible carriers on other farms that would be logically traced and taken out).

14. Blood and Milk.

- 14.1. As the BSE epidemics continued, the MAFF accumulated support for its early contentions that blood and milk were "safe". Blood is a 5th-quarter product used for black pudding; like hoof and horn, it is also applied with other offals in "organic amendments" for gardeners and horticulturalists, and in agriculture. Non-British supplies are used for the extraction of pharmaceutical products, but a number of factors combine to stimulate the output from genetically modified organisms (GMOs), some of which are transgenic animals.
- 14.2. However, the Ministry's explanations have left gaps in the transit of the prions from the feed to the brain. Is there more than one pathway? What are the modes of excretion and decay - in cattle, as well as the other species that take the infection? It seems unlikely that there is no carriage in the blood. The MAFF has drawn on some dubious comparisons with scrapie and CJD - indeed these may be adduced in reverse to throw

doubts on blood transfusions. More recent evidence suggests carriage of prions on lymphocytes, which lends more weight to doubts of contamination of blood (and milk, for that matter).

- 14.3. Closed suckler-herds were supplying less than a third of British beef in the early 1980s. This form of production is more of the extensive, free-range style, and hardly any cases of BSE originated in these herds. The trouble began in intensive dairy/beef/veal enterprises, which were generating most of the beef, not only from steers, some heifers, and bulls of the offspring, but also from the unwanted male calves (for veal) and cast (or culled) cows (mainly for manufacturing meat). These cows were under great stress and succumbed early to production diseases (such as mastitis, lameness, and reproductive failure). Marketing of calves and introducing them into beef herds spread the disease: some Soil Association and organic herds came a cropper and suffered like the rest because their supervision of their livestock and feeds was not tight enough. Even without BSE the dairy-industry has attracted objections from well-informed animal welfarists as much as other intensive systems, such as those for pigs and poultry. Outcry over shipments to veal-rearers on the Continent of live calves had begun to lift the veil on the "milk of human blindness". Whether or not cows' milk transmitted BSE, we were publicly exposing the conditions in the dairy-industry and therefore had extra grounds for criticism when some of its evils were visited on beef farmers unfairly suffering the full commercial brunt of the disaster.
- 14.4. We have had a difficult task in teaching this division in cattle enterprises to a public distanced - and wishing to be distanced - from many farming realities. As representatives of a vegetarian constituency we have had a special duty to examine the corollaries of the BSE epidemic to customers who, as earlier research has shown, may consume - as lacto-ovo-vegetarians ("lovies") - as much or even more animal fat and protein than is normal in the UK because - as "cheesy-tarians" - they replace meat with dairy-produce in their diets; some vegetarians may also be "fishytarians", and others may eat meat or meat-derived products occasionally. These considerations prompted our enquiries of Dr Robert Will at the outset of the BSE epidemic about a patient of his who had been described before the epidemic as a lifelong vegetarian and had died of CJD (but not of the new variant).
- 14.5. A letter to a medical journal from Y. Tamai et al (*J/NEJM/327/649*) prompted me to tax the MAFF with further queries while the BSE epidemic was reaching its peak. This report came from Japan and described proof of infectious material, causing spongiform disorders in mice put through the usual tests, in milk that had been retained from a Japanese mother who had gone down with CJD. MAFF took little public notice of this report and its corollaries; I was assured privately that the rigour of the work was suspect and that control in the laboratory was wanting. This report, however, needs following up.

15. BABs and Forecasts that Erred.

- 15.1. Early forecasts from MAFF heavily underestimated the size of the developing epidemic. Credible reasons for the error could include uncertainty over the precise nature and modes of transmission and recycling of the infection. These reasons were generally adduced by MAFF under questioning. Confusion also arose over the recordings of

dates of notification and confirmation, which could differ by months, and by suspect cases that were not confirmed as BSE. The MAFF also maintained that it preferred to "err on the safe side" by allowing for confirmation at about 80% of the cases notified. This ratio fluctuated at times.

- 15.2. Attempts, even late in the epidemic, to descry, say, seasonal effects in the tally of confirmations cut no ice with the MAFF's epidemiologists: farmers' preoccupations with the priorities of harvesting or Christmas were given, it seemed, more importance than the fluctuations in the dairy industry that would have expected to be more significant.
- 15.3. MAFF's explanations for the BABs imply a low rate of vertical and horizontal transmission and widespread disregard and flouting by the feed trade and farmers of the use of proscribed materials. Its experts aver that the risky products have been identified and they rule out the persistence of other factors, still unrecognised. These assumptions are dodgy.
- 15.4. It could be that the plague struck Britain "out of the blue", a chance with precedents in other pestilences in other areas (eg the recent flu epidemic in poultry in the Far East). A peculiarity in British farming to which MAFF draws attention is the expansion of an already comparatively big sheep industry in which - unlike some other countries - scrapie had not been eliminated. This explanation ignores other intensifications that we have already exemplified; however, MAFF's experts have brooked for some time the possibility that the epidemic merely adds another species that, through carnivory, has fallen victim to a TSE; and, if cross-infection occurs, a new scrapie will run in the sheep flock but now powered by the bovine prion. Sheep are fed concentrates, but at a rate lower than in rations for dairy cattle.

16. Incubation

- 16.1. The record for the youngest confirmed case of BSE in cattle has stood for some time at 22 months. By this age a dairy herd heifer would be expected to be on the point of calving and beginning her 1st lactation, from which her calf would receive colostrum (probably barely its fill) and then scarcely more milk from her, as it was transferred to replacer (which might contain skimmed milk), and the output of the udder appropriated to satisfy human consumption of the mammary secretions. At this time the cow is under much stress and distress, which will continue until the strain overtakes her prematurely with the various aspects of physiological exhaustion. Her output of milk may fall, attempts to put her in calf may fail or abort, she may suffer from lameness, staggers, calving problems (dystokia), retained afterbirth, or ketosis, possibly becoming a downer or casualty, and thus join a number of fallen stock (which would include sheep as well) that would go - without good means of tracing the animals or their meat, at least for many years in the epidemic - to knackers and ultimately to renderers. This disposal could route suspect material to hunt kennels and to the pet-food trade.
- 16.2. Transmissible encephalopathies incubate slowly - over months or years - from the time of infection to manifestation of symptoms. MAFF could plead a lack of simple immunological tests to assess the period of incubation in cattle, although it defended

some questionable assumptions: for instance, it fended off our doubts over the safety of the 6-month rule, the exemptions of which satisfied the dairy/beef/veal industry and Continental rearers of veal and baby-beef (vitello) with a supply of supposedly "healthy" calves. We explained unsuccessfully at the time that MAFF could have availed itself of the EU's calf disposal scheme, aimed at curtailing beef-production, by which male calves from the dairy-industry could be killed younger than 3 weeks and (except for the skins) destroyed, with a subsidy of 100 ecu on each kill.

- 16.3. As with other belated responses MAFF entered the scheme, to succour the dairy-industry mainly, and now about 1 million calves (including a few from beef herds) have been destroyed in this Herod slaughter. Some reduction in cruelty has been dubiously achieved: transhipments of veal calves have been halted and a value has been put on calves that would have fetched very little in the market and so would have received scant care. The value of the ecu fluctuates with the strength of the "green" £; at present each of these sacrificial "bobby" calves yields the farmer about £70.
- 16.4. Nonetheless, the Herod slaughter has attracted dismay at the futility of it all. At a meeting of vets one of the number gave an impassioned account of his inability to continue this part of his functions for the MHS. Sexing of reproduction has not come soon enough to resolve this embarrassment for the dairy/beef/veal industry.
- 16.5. Reports from London Zoo of spongiform encephalopathies in typical herbivores fed on animal remains like those used in rations for cattle yielded clues prompting curiosity. The immunity of species to infection and MAFF's reliance on it were undermined, and the antelope-like victims were of species likely in other circumstances to be eaten by people and other predators, especially if deer were comprehended in the definition. These outbreaks confirmed MAFF's attribution of transmission to contaminated feedstuffs (which might include horse-meat in zoos), but one observation engaged a special interest of ours.
- 16.6. One of the zoo animals was slaughtered apparently healthy because it had become surplus and unwanted. However, it received a thorough postmortem examination, which showed an incipient spongiform encephalopathy. We had been taking opportunities to urge the MAFF to augment its statistical evidence by examining the brains of slaughtered cattle for such signs of incubating disease. I raised the matter at a public meeting in September 1991 at the Royal Institute of Architects attended by Professors Prusiner and Collinge among many other experts on prion diseases, as well as by the press (at least for the morning sessions), and my contentions received what I inferred was uncontested endorsement. In subsequent private discussion MAFF representatives dismissed execution of the suggestion because "the Treasury just wouldn't bear the cost", even of random testing. Evidence of this type would sharpen the statistics of consumption of meat and dairy-produce from animals with incipient disease, probably a greater number than deductions from retrospective reviews of suspect animals (based on signs later interpreted as strongly pathognomonic) going through markets and into slaughterhouses.
- 16.7. MAFF rested its confidence on tests for infective material in organs and tissues taken from stricken cattle; this work also included milk and blood and led as the epidemic progressed to some revisions in defining materials with special risks. Numerous as

these tests were, they provided limited statistical certainty: a small risk in a widely-consumed food, say cow's milk, translates into an appreciable hazard for, at least, an appreciable number of consumers. Moreover, these tests failed to deal with hazards presented by consumption of products from the population of animals incubating the disease undetected and therefore retained in the food chain.

- 16.8. MAFF was taxed with doubts over the relevance of its tests on animals to risks to human consumers of bovine (or, more generally, animal-derived) products. In its defence MAFF could plead that injections into the brain of a test-animal posed a challenge much severer than risks from ingestion and, further, the mouse test was proving less crude than might have been anticipated and, fortuitously, the bovine prion for BSE was turning out - unlike the particles involved in scrapie - to be unique. Evidence is accumulating that the bovine prion is more invasive and infective than the scrapie prions.
- 16.9. The aforementioned meeting at the Royal Society endorsed the prion theory and MAFF's explanation of the outbreak of BSE. It was well attended, but some absences or silences were conspicuous: I heard no contributions to the debate from Professor Lacey, Dr Dealler, Dr Narang, nor Mark Purdey, all of whom had contended in other circumstances with assertions that could have been usefully debated publicly at the well-advertised meeting.
- 16.10. I also raised the query at the meeting of some other protein, even of direct plant derivation, "going prion". This drew no denial, even a little support. Subsequent advances in the molecular biology of brain diseases persuade me that this risk can be set aside with a little less foreboding.
- 16.11. However, in the absence of better tests and controls, we criticised MAFF for its complacency over the reality that nearly all of the British population was involved in an enormous experiment tracing risks that could not be adequately assessed and dealt with by spatchcocked measures to rescue the ramshackle live/deadstock industry. We queried the apparent by-passing of the Public Health Laboratory Service, which had been and is involved with risks and outbreaks of diseases traced to infected feeds and foods and the incompetence - which we repeatedly exposed - in the running of slaughterhouses. The BSE epidemic hastened the initiation 3 years ago of the Meat Hygiene Service, whose activities we have monitored closely and from whom we have extracted, with some difficulty, results for public scrutiny. Our exposures of the deplorable conditions and lack of supervision in slaughterhouses and meat-plants, which should have received more attention before, have been fully confirmed by the latter-day publication and interpretation of Hygiene Assessment Scores.

17. Compensation for Human Victims.

- 17.1. Learning from precedents from increasing resort to litigation and compensation from aggrieved victims and their relations after outbreaks of disease in which vendors and sponsors of incriminated products have been sued, we foresaw early in the BSE epidemic a new group of injured parties among customers who, in view of MAFF's

assurances, would seek redress from the government (which had, in the example of cigarettes, required health warnings on the packets).

- 17.2. I raised the matter with increasing urgency with MAFF and consumer organisations and the National Food Alliance. I recommended an earnest from the government in the form of provision of resources to meet possible claims.
- 17.3. These appeals failed to gain commitment from any of the foregoing organisations, but subsequent events proved our forebodings and a group of litigants has formed, appropriately turning to experts in cases of alleged medical negligence. These victims will be unlikely to fix blame on any vendor(s) (as is done, for instance, after outbreaks of bacterial food-poisoning), so they are likely to incriminate MAFF for its incompetence at crucial times. Taxpayers are therefore likely to bear in this way costs to protect the live/deadstock industry from the harm its errors have done.

18. Recording.

- 18.1. Since the 1960s we have been involved in epidemiological studies comparing the habits, diets, and health of vegetarians with matched groups of non-vegetarians (omnivores). Many similar comparative surveys have been carried out with a wide scope, and results have been published in influential scientific and medical journals. Acquisition of this material has accumulated a treasury of information on subjects and their controls, as well as of preserved clinical specimens, which could prove valuable for purposes other than those originally intended. We have been arguing for some time for better national collation of these studies and modification of protocols to allow volunteers the option of their records being used, with due confidence, in later surveys. As a precedent we cite the relevance of midwives' records on babies to the health many years later of the adults and their risks of heart attacks etc.
- 18.2. These considerations emphasize our pleas in submissions over the proposed Food Standards Agency and reorganisation of the Health Ministries for overhaul of the protocols, management, and collation of results to facilitate versatility in retrieval and extended review of the information gathered.
- 18.3. Victims of CJD and their histories call for retrospective information, relying heavily on memories and indirect evidence, especially relating to the 1980s, when the risks of transmission of BSE seem greatest. It is possible that firm information could be found if the victim had been caught as a subject or "control" in one of the many epidemiological studies of that time or since or projected.
- 18.4. The finding of a vegetarian of 12 years' practice who has recently died of nv-CJD furnishes a good example of evidence of the type sought, especially if we could unearth reliable details of her diet in the 1980s. This case has been used to push the risk period of consumption, with allowance for incubation of the disease, to the early 1980s, on the supposition that bovine derivatives other than milk transmitted the pathogenic particles. However, we seek much more scrutiny of her diet and lifestyle. Was her conversion marked by a steep rise in her consumption of dairy-produce (or fish)? How strict a vegetarian was she? Did she have much to do with live animals (including pets) or selling, buying, or preparing food? She is 1 out of over 40 victims of nv-CJD reported so far - about the proportion of vegetarians in the general population - so this slim

statistical information might be taken to represent a general environmental or dietary risk that has risen in the UK in the last few decades, and probably with a bovine connection. I have emphasised on many occasions and with increasing conviction that the implication of sheep and scrapie in the origins of the BSE epidemic may be credible but misleading: cows have for years been "going off their legs", staggering, and falling down without full diagnosis, and some may have gone to slaughter with BSE, which was disseminated by feeds affected by the changes in production, so the transmission was cannibalistic rather than "carnibalistic", and we might expect to see sheep manifesting scrapie caused by infection of the bovine type. Further research will clarify the matter.

19. Animal Welfare.

- 19.1. I raised at the public launch of the BSE Inquiry (**27 January 1998 IAI Tab 12 page 24C**) our concern during the epidemic of the distress inflicted on the cattle, mainly dairy-cows and calves, as a result of bad husbandry. The toll has added a hefty burden to these already abused animals and it continues, with casualties born after the ban and difficulties in tracing contacts and cohorts because of shortcomings in markets and dealings that we have been condemning for years. Supermarkets have shown more urgency than MAFF in avoiding these unnecessary stresses, because they are requiring their supplies to be sold direct from the farm to slaughterhouse, with full traceability. However, efforts at identifying cattle and sheep and their origins have resulted in a profusion of ear tags, attached by piercing the ear and subject to tearing out in the commercial hurlyburly.
- 19.2. Trials had been carried out before the BSE outbreak, within and without the industry, of ingredients in feeds to raise feed conversion rates and ratios. Sources of desirably metabolizable energy and protein, as well as supplementary vitamins and minerals, were being sought to intensify production. The dairy cow was a subject for such attention as efforts were being made before the reporting of BSE to stimulate her output well above the yields attained on forage alone. British farming economists - much more than those in many parts of the Continent - were aiming at increasing outputs per cow rather than by enlarging the national herd; correspondingly, each stockperson was required to attend to more and more cows.
- 19.3. In many countries milch cows were and are kept in tie-stalls. In the UK few cows are now kept in such systems; instead, many dairy-herds are overwintered in housings provided with scantily-bedded cubicles, long straw being undesirable because it clogs the drains into which effluents are scraped mechanically, and it is expensive. Continental practices are harsh but the feed-in-one-end-excreta-out-the-other allows a separation of hygienic importance.
- 19.4. The cubicles have attracted increasing condemnation for the stresses they inflict: the cows cannot rise and lie comfortably, nor do they cud adequately, and they cannot avoid injuring and dirtying themselves. Resort to "farmerceuticals" in a big way has not stemmed the tide of woes: mastitis, trampled teats, dropped udders, cuts and bruises, lameness, reproductive and calving troubles (dystokia), cystic ovaries, and retained (and infected) placentas (cleansings) are typical and persistent problems

associated with dairy farming as it has been intensified, especially after the epidemics earlier in the century of tuberculosis, brucellosis, and food-and-mouth. Cows in housings and in seasonal grazings share space and feeds with rats, mice, cats, birds of all sorts, as well as with badgers, foxes, and snakes, and they may be bitten in such conditions. The workings of the relentless milking machinery do these cows harm.

- 19.5. Artificial insemination, sales of semen, and resort to reproduction adjusted with pituitary and prostaglandin hormones allowed farmers in the dairy/beef/veal industry to serve the god of productivity after World War Two with a form of genetic engineering crude by the standards of today, but lucrative. One stud-bull could in this way beget thousands of calves and, literally, be worth a million. Sunny Boy, a Dutch stud, was recently siring in this way a cross-bred calf every 20 minutes. Semen is an important trade in the farming business.
- 19.6. Since the 1950s animal welfarists have been at pains to include the dairy-cow with the pigs and poultry attracting most of the concern over factory-farming. Crops can be turned into palatable milks in gleaming stainless steel vats without recourse to the udders of miserable overworked, and mucky cows. Plamil was and is a pioneer alternative. It has been complemented by a range of "dairy-products", some of which have been on sale latterly in supermarkets.
- 19.7. Recognition that meat and milk were "foods that cry" informed a series of articles I wrote during the 1970s in the Vegetarian, and Graham Harvey, a journalist and author, wrote an arresting article for the New Scientist on the animal welfare aspects of milk production; he writes scripts frequently for The Archers and acts as an adviser on agricultural matters, for which he is impressively qualified.
- 19.8. For the last 15 years or so VEGA, with the Young Indian Vegetarians, has been supporting a farmer and his wife who abandoned dairy-farming about 25 years ago because they forbore any longer to suffer the anguish in the marketing and slaughter of the cows and calves. The animals have been retained unmolested on the 90 acres of Court Lodge farm, which has had no case of BSE, but - ironically - is denied all the benefits and grants it might have gained had it remained in the detestable business with its dire consequences. We have sought assistance unavailingly from ADAS and the DOE.
- 19.9. The farm became the location for a BBC Food Program on Radio 4 on The Cow. The program was scheduled, trailed, and well reviewed (by the Daily Telegraph and Guardian) in February 1993, but withdrawn at the last moment. The outcry over the suppression of the disclosures over "the milk of human blindness" attracted lively correspondence with the BBC, whose mandarins did not budge. Tapes of the suppressed program have been in brisk demand.
- 19.10. As higher yields were extorted from the cows proteinaceous meals of various origins were assessed as ingredients in concentrates. Such constituents included soya, fish, and rape meals, as well as MBM. Relative costs drove the market and problems with the carriage of salmonella and contamination were embarrassing the trade, which had also to contend with outlets for oils, fats, and tallows, especially as imports of vegetable oils, eg from Malaysia, competed strongly in manifold applications.

- 19.11. For ruminants farmers clamoured for sources of protein that passed undegraded through the foregut and were thus of undiminished nutritive value when they reached the "true" (4th) stomach (the abomasum or vell). MBM is a source of non-degradable protein and may also contain useful amounts, according to the method of production, of fat, which adds to the calorific value (as a concentrated source of energy). Defatting of the meal to different levels, as well as the other factors, influenced changes in the rendering process, notably in the heat and solvent processes in reducing the fat content of the greaves. The products were at the best of times variable and MAFF paid much attention to the processes and the output from individual renderers as it developed its theory on the spread of BSE.
- 19.12. There were no assessment scores in the public domain for renderers (nor are there now) and MAFF did not entertain our enquiries. Unofficially I learnt that Scottish MBM from Forrest's was "the best" and most consistent and that this distinction accounted for the relatively lower incidence of BSE in Scotland. This deduction was unconvincing: it needed correction for the proportions of closed suckler herds to dairy/beef/veal enterprises. In the outcome the former have suffered disproportionately from the follies of the latter.
- 19.13. The public outrage over turning cows into cannibals erupted only when MAFF's explanations over the causes of BSE taught customers facts known to farmers for years.
- 19.14. I saw feedstuffs from Mole Valley Farmers that were comprehensively labelled in the 1980s. Some farmers mixed their own compound feeds, using bought-in "straights". It is unlikely that they didn't know they were buying MBM and that it was what it was aptly named. However, I must say now, as new issues attract attention, that I've met livestock farmers unable to account for the origin of the "prairie meal" they feed their confined stock.
- 19.15. Of the nutritional tests on MBM described before the BSE epidemic (probably in the 1970s) I found work done at Professor John Webster's Dept of Veterinary Medicine, Bristol University, of special interest. Professor Webster has established himself as an authority on the dairy cow and her calf and he has served a notable spell on the government appointed (but supposedly independent) Farm Animal Welfare Council. The FAWC has recently completed, after several years, a long overdue report on welfare of the dairy-cow and made nearly 200 recommendations for reforms, many reflecting comments made in our relevant submission to the FAWC.
- 19.16. The epidemic has also instigated many tests and experiments, some of questionable relevance or value, in the affected species, as well as in rodents and higher mammals. Animal welfarists are put in the predicament of citing the results of such practices in their indictments of the meat-industry. We voiced misgivings over the inability to find simple immunological or other clinical tests of infection and considered the possibilities of experiments that were being mooted for reactions in chimpanzees, as had been done in studies in the USA on other transmissible spongiform encephalopathies.
- 19.17. British scientists, obeying Home Office stipulations, are reluctant to experiment on chimpanzees. Commercial interests were not strong enough to override this

reluctance; and the possibility of transmission to human consumers seemed strong enough without extra endorsement of this type. Subsequently, the uniqueness of the bovine prion, the power of the mouse test, and the clinical characteristics of nv-CJD combined to reinforce the reluctance to resort to experimentation on chimpanzees. However, this is a predicament and challenge we've been unable to translate to commentators with various views on these matters. Continuing experimentation will involve more animals in various species. We hope that the search for less exceptionable alternatives will be sought and that more care will be taken in the design and necessity than was shown in the rushed expedients undertaken when alarm was at its height.

- 19.18. During the epidemic we have been approached by representatives of Jewish, Muslim, and Hindu authorities for reassurances that their practices and rituals reduce the passage of the infective agents to their communities and to customers buying kosher and halal meat. (In the UK Jews eat only forequarter beef from cattle slaughtered by shechita; the rest is sold, undistinguished, through the normal butchery trade).
- 19.19. The animals for the Jewish and Muslim trades are drawn from the normal supply of the relevant stock, so the customers appear to gain no benefit of selection on that count; nor would the methods of slaughter or inspection bestow any protection. Our advice on this seemed to be accepted in the appropriate quarters. Jewish butchers are now increasingly obtaining their supplies from Argentina.
- 19.20. The question of slaughter has dominated controversy between animal welfarists and apologists from the Jewish and Muslim authorities. However, both the Old Testament and the Koran have much to say on farming husbandry; the Koran enjoins the faithful to observe practices that pay high regard to the animals' dignity and freedom in terms that belittle the Farm Animal Welfare Council's 5 Freedoms and the RSPCA's stipulations for Freedom Foods. These standards would not brook the conditions and feeding inflicted on the commercial cow, so their observance would have averted the disaster of BSE. As in other instances the authorities blinked the compromises behind the production of abundant - even excessive - quantities of cheap food. Attention to holy writs was overtaken in reviews of literature to some (fortuitously) prescient words by Rudolf Steiner and to apt observations from Sir Andrew Aguecheek on the effect of beef on his wit. Clever commentators managed to trivialise with flippancies the underlying messages that had erupted into significance.
- 19.21. We were invited by elders at the Hindu temple at Neasden to assist with a petition to the Prime Minister John Major over the fate of the cattle affected by the BSE epidemic. This concern was triggered by a belated recognition of the ill-treatment of the cow, an animal specially revered in the Hindu religion. The interpretation was muddled – as we had to explain in the McLibel case – by confusion over British and American usage of generic terms: Americans tend to use cows as a generic word for cattle, male, female, neutered and juvenile, whereas the British retain sharper definitions. However, British commentators may speak of a sheep, but jibe at talking of a cattle (a neat is probably the appropriate word). I found that the heifer test sorted reliable commentators from the great unversed. I answered a number of calls from media researchers to explain what a heifer is.
- 19.22. As drafts of the proposed petition multiplied, the issue was complicated by Hare Krishna

proponents from both the UK and USA of low-intensity cattle-keeping, with calves kept as oxen for draught purposes and cows kept, ideally, in sanctuaries after their scanty lactations had ceased. This irrelevance to commercial production in the UK hindered understanding and action on the matter and eventually a petition was presented in July 1996 with almost no trenchancy. We recommended Hindus to emphasise their concern by recurrence to the traditions of satyagrahi and Gandhi's example by heeding the cows' plight by forgoing dairy-products in a concerted boycott lasting as long as they could manage. We were not suggesting any abstinence more than we observe all the time. The recommendation was ignored and lost.

20. The Environment.

- 20.1. A few years ago at a big international meeting in Edinburgh of cattle farmers and vets I raised a question that had informed earlier enquiries of MAFF: that we had no assurance that the prion - a particle more robust than bacteria or viruses - could persist in the environment and be carried in zoonotic cycling. Spillages or dumping of contaminated feed could affect pastures, the soil, and water-courses. Grazing animals consume appreciable amounts of soil with the grass.
- 20.2. Of all the materials tested as possible means of transmission, excreta had escaped the trawl. Dr Will at the meeting accepted this statement. At a meeting in 1998 Dr Ironside of the Veterinary Public Health Association agreed on the fact of omission, but mentioned practical difficulties with present means of testing. Offals from slaughterhouses and renderers are accused of passing on bacteria such as E coli 0157; why shouldn't dumping of the robuster prions from such a source transmit danger?
- 20.3. Pathogens jumping species undermined assurances that the spread of transmissible enteropathies could implicate wild and feral animals, as well as pets, and that they could die and decompose in the environment, releasing their burden of harm. The Ministry's tests have not comprehended the many birds, foxes (and other prey, eg mink and coypu), rodents, badgers, snakes, and insects that share the environment with cattle - and especially with pets - with people.
- 20.4. It seems possible therefore that the dangerous prions may seep into waters drunk by people and animals.

21. The Pharmaceutical Industry and Hopes of Cures for BSE, CJD etc.

- 21.1. Except for vaccines veterinary plagues are not profitable enough to initiate a commercial interest in therapy beyond what might be adapted from research on the medication of people, and human sufferers of spongiform encephalopathies of the CJD, although seriously and mortally afflicted, do not comprise a market big enough to attract the commercial investment in the necessary research. That is now being devoted to the dementias of senility. Further, the relatively small group of patients with CJD and its like have already been fragmented into significantly distinguished genetic sub-divisions.
- 21.2. Chances for immunisation have been and are low because the nature and action of the infectious particles are mysterious and, again, the size and profitability of the market are unknown. Involvement of the resources and skills of the pharmaceutical industry

would benefit research into these diseases desirably, and I know that it reviews forecasts of the spread and the financial implications of ventures to these ends. Commentators with outspoken forebodings of the magnitude of this market in spongiform brain disorders have been bending the ears of pharmaceutical companies with hopes of engaging attention and earning a consultancy.

- 21.3. A burgeoning market exists for rapid diagnostic tests and for the appropriate kits. These are needed both for surveillance for transmissible infections throughout the food-industry and for forensic and research purposes, especially in the replacement of tests on live animals, which - as in the examples of the TSEs - are slow and objectionable on other counts. Detection of animal protein in feeds and food has been possible for some years to distinguish the species it is derived from (eg horse meat or human flesh in beef products, but not goat in sheep-meat), and advances in genetics and immunology bid fair to extend the scope of these procedures. Commercial enterprise in these endeavours, in which the pharmaceutical industry is involved may yield information that will remove the present impediments to developments in the search for cures and immunization.
- 21.4. However, eradication of causes at the root of these scourges must be expedited by good practice, even if precise mechanisms of the harm cannot be posited.

22. Additional Diary of BSE Related Activities

- 22.1 The following paragraphs record some of VEGA's activities in relation to BSE. Much of this information comes from brief notes in diaries and from documents not removed in routine clearance of files. Correspondence on reports, programmes and other communications may precede publication, which may have aborted, anyway.

22.2 1988

5 October: Fringe meeting of Vegetarian Society on Farming and Health Policies. Labour Party Conference, Blackpool.

12 December: Material on BSE for Clive Edwards, This Week, Thames TV.

22.3 1989

26 March: Material for a Countryfile programme, BBCTV1, dealing with scrapie and BSE and neurological disorders, including Alzheimers, motor neurone disease and neurofibromatosis. Risks from blood transfusions, organ donations, and use of biological material (animal and human) were raised.

24 May: Material for James Erlichman on the USA Department of Agriculture's attitude on BSE. Material for a BBC farming programme on the 5th quarter and offals.

17 September: Report on zoonoses for the National Food Alliance completed.

27 September: Food Safety and the Human Food Chain, Queen Elizabeth Conference Centre, London.

30 October: How safe is our food? British Nutritional Foundation, Royal College of Physicians, London.

14 December: Material for a Consumers Association report on BSE.

22.4 1990

19 January: At a meeting, possibly at the Royal Society of Medicine, I raised queries over the risks of transfers of resistant pathogens (e.g. prions) by surgical procedures, instancing veterinary practices in embryo transfers in farm animals and the necessity for caesarian sections for the birth of oversized calves as a result of imprudent breeding.

14 and 28 January: Material for the press on oxtails, haggis, tripes, reticulum, lymph nodes and chitterlings. A suspicion was rife that MAFF was holding back certain restrictions until after Burns Night on the 25th.

27 January: Letter from Roger Eddy in Veterinary Record, expressing alarm over caesarian sections on BSE cows.

1 March: Phoned Dr Robert Will in Edinburgh, for further information on a vegetarian victim of CJD, described in a letter from Dr Will in the Lancet a few years before. We discussed other points.

4 March: Material for Countryfile BBCTV1 on MBM and MRM ("You are what you eat").

10 and 11 September: Universities Federation of Animal Welfare meeting at the Royal Agricultural College, Cirencester, on Organic Livestock Production.

17 October: Meeting on BSE of the Society of Chemical Industry, London.

22.5 1991

28 to 30 January: Discussions with Gist Brocades on sources and supplies of "natural" and recombinant biological products, such as insulin, heparin, chymosins and gelatin.

31 May: One of several contributions of material for a three part BBCTV1 drama called Natural Lies on a BSE theme.

29 and 30 June: A conference and discussion on the Safety and Quality of Food from Animals, at Bristol, organised by the British Society of Animal Production.

5 and 6 September: Conference at Bangor University on Farm Animals and the Environment. Professor Lacey lectured.

19 to 21 September: Annual conference at Torquay, of the British Veterinary Association. The argument over the control of various pathogens on proteinaceous feedstuffs erupted (see page 5, paragraph 3.2).

22.6 1992

6 February: The first of two farm visits this week. I have made many such visits during the BSE epidemic, for various reasons. In the first of these visits this week I went to a school farm, which runs a herd normally of about 42 cows. Of 30 cows in milk at this time, 2 were severely lame. The farm had had “three or four” cases of BSE. Part of its output was diverted to a tank reserved for the officially approved supply of kosher milk for Jewish customers in London. Although the farm abutted the school’s premises, few pupils manifested any interest in its activities. In the 2nd excursion, I visited a farm where the herd averaged 170 cows. They had “nine or ten” cases of BSE by this time. This farm had been popular for school visits, but changes in educational policy were blamed for a sharp reduction in such outings arranged by local schools.

18 May: I was busy furnishing Deborah Cadbury with material for a projected BBCTV Horizon programme that was subsequently called Fast Life in the Food Chain. This was completed and transmitted some months later.

15 September: I provided Joan Tull with information and material intended for a Public Eye TV programme.

17 November: At a meeting of the Society of Chemical Industry in London on Organic Materials in Agriculture, I learnt of, and exposed examples of, condemned stocks of feed being stored in bins within the walls of mills providing feed going to merchants and farms. I emphasised the risks of transferred pathogens (see page 7, paragraph 5.7).

22.7 1993

10 March: Material supplied for a Channel 4 TV programme on The Cow.

23 April: Information for Clive Edwards on the BBC Panorama Programme.

5 September: More material and information provided for Channel 4, now on prion diseases.

22 and 23 September: Participated in the big meeting in London, at which Dr Prusiner lectured on prions, especially BSE. In particular I pleaded the case for random testing to assess the prevalence of clinically symptomless incubation of BSE and the risks of corollaries.

7 December: The Mail on Sunday published at this time a major feature by Peter Martin on the BSE epidemic and its corollaries. I had provided him with much information and comment.

22.8 1994

13 September: I had discussions at this time in connection with their special interests with Nitin Mehta, representing the Young Indian Vegetarians, and Ibrahim Jaffat, representing the Islamic Consumer Council.

22.9 1995

23 January: In discussions at a meeting with the National Food Alliance I raised an issue that had been in abeyance until MAFF availed itself of an EU provision that became the Calf Processing Aid Scheme to remove the “waste” of bobby calves from the dairy/beef/veal industry.

18 April: Participated in a meeting organised at the Royal Society, London, by the British Veterinary Association and the RSPCA on the Economics of Farm Animal Welfare.

3 May: Completed updated material on a farm and the farmers’ rejection of the dairy

industry. This was intended as a means of enlisting support for their stand.

29 May: At this time I was providing Richard Girling, of the Sunday Times, material for an article he was writing on The Cow.

14 July: I provided Claire Burnet of the Consumers Association with information on milk and BSE.

22.10 1996

March: At an annual event of the Veterinary Public Health Association, of which I am a member, I discussed many matters with Dr Ironside, notably environmental spread and the persistence of risks due to resistant pathogens such as prions.

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