

# **Poison in the Garden of England: Pesticides, Pollution, and the Modern State in the 1960s**

***JFM Clark***

## **INTRODUCTION**

Throughout 1963 a veterinary surgeon, Douglas Good, struggled to explain the sudden deaths of dogs and various farm animals near the village of Smarden, Kent, in the UK. After suspicion had fallen on a local manufacturer of pesticides, Good had difficulties identifying the specific poisonous substance. Ultimately, an Oxford-based laboratory confirmed that the deaths had been caused by fluoroacetamide. This was a particularly nefarious substance, which had been used as a rodenticide and an insecticide. In the immediate aftermath of the ‘Smarden Affair’, the British government acknowledged it as ‘an unfortunate industrial accident’. A manufacturer of pesticides in Kent had indiscriminately dumped post-production waste onto the land outside its factory. This land was close to a stream and was surrounded by farms, which included cows, sheep, goats, and dogs. Despite the Ministry of Agriculture’s best attempts to disassociate itself from further involvement in an ‘industrial accident’, which was more appropriately the domain of the Ministry of Housing and Local Government, the Smarden Affair remained stubbornly within the rubric of a Carson-inspired ecological critique of the misuse of pesticides in the countryside.<sup>1</sup>

Jon Agar contends that ‘something about science changed in the long 1960s’. Taking a cue from Brian Balogh’s examination of expert debate surrounding nuclear power in the USA, Agar argues that the 1960s witnessed the emergence of publicly visible, divergent views of experts. In identifying when and where ‘agents emerged who could turn observable discord into observed discord’, Agar posits three overlapping factors (or ‘waves’). First, a scientist was driven to make a public display, which highlighted disagreement. Second, emergent social movements provided fertile soil for the burgeoning demand for experts, and for the increasingly visible disagreements among them. And, finally, opposition arose, which questioned the very role of expertise. Scientists, as activists, played a key role in this process. Rachel Carson, for example, was a biologist, with considerable experience of working at the Fish and Wildlife Service, when she made publicly visible the contested nature of DDT and other pesticides. Expert knowledge about the baneful effects of DDT stretched back to 1946, but not until the 1960s were numerous divergent views sufficiently accessible so that they could be co-ordinated by the likes of Carson to highlight a publicly visible debate. Journalists played a key role in this process – as communicators, as proxy experts, and as active critics of science.

Agar’s argument provides a useful framework with which to examine nascent modern environmentalism, or ecologism, in the 1960s. As he suggests, it affords examination of a transnational phenomenon, which reaches beyond purely nationally specific causes. Moreover, by highlighting conflict of expertise, it affords a rich and complex analysis of environmental governmentality. John Sheail’s useful and numerous scholarly studies of nature conservation in twentieth-century Britain offer a valuable insider’s account of the power of carefully considered, modest, incremental changes of an

increasingly technocratic and interventionist government. Sheail eschews big ideas as engines of history, and, instead, focuses on the working minutiae of governmental ministries and organizations. Although his accounts consistently chart the negotiations between government, business, and amenity bodies, they afford little sense of the plurality of publicly visible expertise, and of any contestation and resistance.

The Smarden Affair sheds light on the relationships between environment and governmentality, within the context of contested expertise. Douglas Good, a veterinary surgeon, made publicly visible disagreements on the place of synthetic chemicals in the environment. Drawing explicitly on the example of Rachel Carson, and operating within a Cold War culture, Good questioned the attendant risks of rational science, in the service of government, military, and capitalism. Through print media, radio, and television, the Smarden Affair made visible the contested nature of pesticides and other synthetic chemicals. Much of the contemporary criticism drew upon popular ecology to emphasize the environmental dangers of scientific reductionism in the service of disciplining the countryside for agriculture. Good, and the Smarden Affair, played a significant part in redefining perceptions of the agriculturists' role in managing the rural environment. At the same time, they also facilitated a shift from natural history to ecological governmentality. Good effectively located Smarden within a broader critique of expertise by allying himself with organizations associated with the environmentalist social movement.

### **SMARDEN'S SILENT SPRING**

In his published memoirs, politician and journalist William F. (or Bill) Deedes placed the Smarden Affair in its historical context. He devoted a single chapter to the years '1963-64': the only chapter to be entitled chronologically. As he observed, '1963 was a year in which a lot happened in the world': de Gaulle blocked Britain's membership to the European Economic Community; the Great Train Robbers absconded with £1 million; Martin Luther King gave his best-remembered speech in Washington; Kim Philby was exposed as the 'Third Man'; John F. Kennedy was assassinated; and Christine Keeler was jailed in the wake of the Profumo Affair. We might add to this list the UK publication of Rachel Carson's *Silent Spring*. Bill Deedes, long-serving Conservative MP for Ashford, Kent, sometime cabinet minister, and renowned twentieth-century journalist, made no mention of Carson or her book, but he did devote several pages of his account of the momentous year to 'the strange episode of the poisoned dog'.<sup>2</sup>

Perhaps betraying his journalist roots, Deedes, in his memoirs, invoked the spirit of Conan Doyle's Sherlock Holmes to name the events surrounding a toxic waste incident. At the time of the actual incident, Deedes had likened the events at Smarden to a Dorothy Sayers or Freeman Wills Croft novel, before pronouncing that 'Smarden henceforth will have its place in the gathering controversy about the use of toxic chemicals'.<sup>3</sup> John Coleman-Cook maintained that it was like a science horror story in the tradition of *The Kracken Wakes* or the *Death of Grass*.<sup>4</sup> Undoubtedly, these comparisons were partially dramatic license in aid of polemic; but they were also indicative of active efforts to frame the events of Smarden. Contemporary commentators sought to impose a narrative structure on a series of events, which the government consistently resisted placing in a broader context. Rather than crime, horror or science fiction, contemporary commentators' interpretive framework was Rachel Carson's *Silent Spring*. Occurring in

1963, the Smarden Affair coincided with the British publication of Rachel Carson's fourth and final book, which had appeared in the US in the previous year.

In his *Politics of Environment*, Stanley Johnson contended that 1963 was a watershed year for 'environmental' consciousness in Britain.<sup>5</sup> It was, after all, the year in which Britain held the first National Nature Week, which, in turn, inspired the Duke of Edinburgh to initiate the movement known as 'The Countryside in 1970'. The latter provided impetus for European Conservation Year in 1970. Johnson asserted that this growing environmental consciousness was borne of anxiety about what was occurring in the countryside; but he offered little explanation as to why 1963 was the year in which these anxieties were articulated. Although he noted the importance of Carson for the birth of the 'ecology movement', he did not locate her in the British context of the pre-existent fears for pesticides and other toxic chemicals. Smarden, which coincided with the British publication of *Silent Spring*, provided a forum for the expression of growing anxieties. In this manner, a parochial waste spill in the Garden of England became a nationally significant toxic chemical incident.

*Silent Spring* opened with 'a fable for tomorrow'. It described a 'town in the heart of America ... in the midst of a checkerboard of prosperous farms with fields of grain and hillsides of orchards ...'. But an 'evil spell' had settled on the community so that it was now bereft of the beauty of wildflowers: fruit trees were barren, birds silenced, and 'everywhere was a shadow of death ....'. Carson informed her readers: 'This town does not actually exist, but it might easily have a thousand counterparts in America or elsewhere in the world'.<sup>6</sup> The parish of Smarden, which encompasses about thirty square miles in the Weald of Kent in southeast England, seemed to confirm Carson's predictions.<sup>7</sup> The Rentokil factory, from where the toxic insecticides emanated in 1963, sat in the middle of agricultural fields about one mile from the historic, quintessentially English village of Smarden.<sup>8</sup> In excess of 100 of the village's houses and buildings have been listed for architectural and historic interest. As if to reinforce the transnational character of Carson's tale, Smarden's architecture had acted as inspiration for many of the buildings in the restored village of Williamsburg, Virginia in the USA.<sup>9</sup> In an account of the 'Smarden poisoning', which he published in a local newspaper and in the Soil Association's *Mother Earth*, and which he broadcast on BBC Radio in early 1964, veterinary surgeon Douglas Good offered the following lament: 'The house-martins never came this spring, and there was no bird-song in the hedgerows. The only rabbits were a few young ones, picked up dead in ditches. The subject of Rachel Carson's book *Silent Spring* had become a reality here in the heart of the Garden of England'.<sup>10</sup>

Once renowned for the manufacture of broadcloth, Smarden's local economy was dominated by agriculture since the nineteenth century. Initially, hops were the principal crop in the area, but by the mid-twentieth century, cattle prevailed. Only about 25 percent of Smarden's acreage was arable.<sup>11</sup> The heavy clay soil, which had proven so amenable for hops, was equally suitable for the apple trees that replaced them. The premises occupied by Rentokil had originally been a temporary apple pulping factory. In 1950, consent had been granted for the building to be used for the light manufacture of an apple spray. Rentokil acquired the building in 1959 to repackaging pesticide for sale and distribution, but in late 1962, the company began to manufacture methyl bromide and fluoroacetamide.<sup>12</sup> The latter chemical was sold as an insecticide and a rodenticide. Safety recommendations for the use of 'Tritox', a 1 percent concentration of

fluoroacetamide for garden use, were issued by the Ministry of Agriculture in 1956. One year later, these recommendations were expanded to cover ‘Megatox’ (‘Vitax F15’ and ‘Flac’), a 15 percent concentration of fluoroacetamide for agricultural use. As a stronger poison, the latter also required certification and record of purchaser in the poisons book. Under the trade names ‘Fluorokil “100 Per Cent”’ and ‘Fluorkil 3’, fluoroacetamide was also sold as a rat poison.<sup>13</sup>

In Britain, war-time necessity had made the nation ‘a pacesetter worldwide in intensive agriculture’;<sup>14</sup> and post-war reconstruction entailed a continued intensification of agricultural production that accelerated in the years following 1960. Farming metamorphosed into ‘agribusiness’ as holdings increased; specialization and mechanization flourished as the mixed farm went into sharp decline. Whereas there were about 60 farms in the parish of Smarden in 1881, numbers had fallen to 32 by 1950.<sup>15</sup> As agriculture became more ‘industrialized’, cheap nitrogenous fertilizers were applied to enhance soil fertility, and a ‘huge expansion’ in the application of synthetic chemicals ensued.<sup>16</sup>

Contemporaries considered the Smarden Affair to be evidence of the unwelcome elision of country and city.<sup>17</sup> They repeatedly remarked on the factory’s alien presence in the rural countryside. M. Pym, a member of the West Ashford Rural Council, observed, ‘I would think if you live in a rural farming community you don’t expect to have sulphuric acid down your ditches and noxious smells over your hedges’.<sup>18</sup> The response to the Smarden Affair was part of a growing post-Second World War criticism of technocracy’s negative impact on the English environment. W.G. Hoskins, in his *The Making of the English Landscape*, described a devastated English countryside, over which ‘drones, day after day, the obscene shape of the atom-bomber, laying its trail like a filthy slug upon Constable’s and Gainsborough’s sky’. He continued, ‘Barbaric England of the scientists, the military men, and the politicians: let us turn away and contemplate the past before all is lost to the vandals’.<sup>19</sup> By the 1950s and 1960s, the mix of modernism and conservationism, in the form of planner-preservationism, was increasingly replaced by an anti-modernist lament against the trashing of the countryside: governmental science, in aid of agriculture, was pitted against vernacular Englishness - a Romantic re-envisioning of environment, which reached beyond ‘buildings and fields’.<sup>20</sup> Smarden, the epitome of vernacular Englishness, had been blighted by an ugly factory which was little more than an over-grown corrugated iron shed; and from which spewed chemicals that traced their origins to the military-industrial complex of the Second World War.<sup>21</sup>

G.H. Lowe of Great Omenden Farm struggled to place the events of Smarden within his vision of modern Britain. He told Good, ‘I find this position, where a potential danger has been brought about by an industrial enterprise in a Rural District which has cost animal life so far and may bring more danger, not compatible with modern legislation ...’.<sup>22</sup> Throughout the first half of the twentieth century, the ideal of England as a ‘green and pleasant land’ was forged through a modernist commitment to preservation as realized through legislative planning. The West Ashford Rural District Council, therefore, initially approached Smarden as a planning issue. The Council ordered a suspension of production at the factory in August 1963, pending a review of planning permission on 30 September.<sup>23</sup> Some confusion had arisen over whether Rentokil’s permission for ‘light industry’ extended to the production of methyl bromide and fluoroacetamide. On 2 October, the BBC reported that the Council had refused

Rentokil permission to manufacture fluoroacetamide.<sup>24</sup> Interestingly, earlier discussions about planning permission had principally referred to methyl bromide. B.W.J. Wulff, manager of Rentokil's Smarden operations, informed Good on 18 July:

Bromides are the only poisonous materials apart from sulphuric acid which could have reached the ditch. We do however handle a number of fluorides here although I cannot see how these materials could get into ditches or ponds on our property.<sup>25</sup>

And as late as 26 September, Keith Joseph, Conservative Minister of Housing and Local Government, informed Deedes, Conservative MP of the affected constituency and Minister without Portfolio, that Rentokil's pending application to the District Council was 'for the manufacture of methyl bromide'.<sup>26</sup> By August, however, the Ministry of Agriculture had realized that methyl bromide was not the problem: in the internal report of his investigation of Smarden, Ministry scientist D.S. Papworth concluded:

It is difficult to escape the conclusion that the management of the factory are aware of the incident or practice which may have caused the ditch to become highly contaminated with fluoroacetamide and fluoride waste processes, as a result of which they have made a statement about sulphuric acid and other materials, following it up by attempting to hide the evidence of what might have occurred.<sup>27</sup>

Events rapidly conspired to shift attention firmly from methyl bromide to fluoroacetamide.

### **SMARDEN AND THE LIMITS OF POLLUTION LEGISLATION**

As various ministries of the central government sought to define and contain the incident at Smarden, they highlighted the potential shortcomings of environmental legislation, which had arisen out of the nineteenth-century 'revolution in government'. The twentieth century witnessed a vast proliferation of synthetic chemicals; and, as Smarden demonstrated, these impacted air, water, and land. Could nineteenth-century legislation address the ecological complexities of the twentieth-century chemical revolution?

Through the drift of noxious fumes and Rentokil's misdirection, the spectre of methyl bromide meant that the Smarden was initially framed as an air pollution incident. When the West Ashford Rural District Council halted production at the Rentokil factory in August, the *Kent Messenger* reported this as action against the 'Smarden "smell"', which one member of the Council proclaimed 'was perfectly shocking'.<sup>28</sup> Similarly, in his second letter to the Ministry of Agriculture, Judge J.D. Casswell complained of a 'nuisance' that arose from the manufacture of an insecticide using bromine. He associated the resultant fumes with the death of a foal, two goats, and approximately 100 rabbits on his son's farm, which was 100 yards from the Smarden factory on the opposite side of the road.<sup>29</sup> With the Killer Smog episode of December 1952 still fresh in people's memories, it was, perhaps, unsurprising that a London resident would link the death of animals and the poor health of humans to air pollution. But the events of 1952 may also have made Judge Casswell more aware of the legalities of air pollution. Casswell would have known that the word 'nuisance' carried meaning in common law. Moreover, he concluded his letter by noting that the Rentokil factory did not have the required licence under the

Alkali Acts. In short, Casswell clearly realized that, in Britain, public interest in pollution was served by a combination of nuisance law and administrative procedures.<sup>30</sup>

In the wake of the London smog of 1952, the Clean Air Act of 1956 resulted in the widest extension of the duties of the Alkali Acts inspectorate since 1881: as of 1958, all industrial smoke ceased to be the responsibility of local authorities and fell within the remit of the inspectorate.<sup>31</sup> The Alkali Acts, which traced their origins back to 1863, have been acknowledged as ‘the first administratively successful and systematically applied scientific governmental policy directed towards the positive regulation of the nation’s chemical industry’.<sup>32</sup> The alkali trade was the beginning of Britain’s heavy chemical industry: sodium carbonate, or soda, was produced for the manufacture of glass, soap and textiles. Hydrochloric acid gas, a by-product, mixed with moisture to descend as clouds of acid upon the once green and fertile fields around Widnes, St Helens, the Mersey, and the Tyne:

The sturdy hawthorne [sic] makes an attempt to look gay every spring; but its leaves ... dry up like tea leaves and soon drop off. The farmer may sow if he pleases, but he will only reap a crop of straw. Cattle will not fatten ... and sheep throw their lambs. Cows, too ... cast their calves; and the human animals suffer from smarting eyes, disagreeable sensations in the throat, and irritating cough, and difficulty of breathing.<sup>33</sup>

Witnesses to the environmental devastation of 1862 offered descriptions strikingly similar to Carson’s lament one hundred years later.

From the outset, the Alkali Acts had been conceived as a balance between the requirements of industry and the well-being of society. Rather than through punitive regulation, the inspectorate most often encouraged manufacturers to reduce pollution through technical instruction and technological awareness. Furthermore, the Alkali Acts employed the formula pioneered by the Leeds Improvement Act of 1842 – ‘best practicable means’. If manufacturers could demonstrate effort to mitigate pollution through the ‘best practicable means’ available to them, they were exempt from penalty or prosecution.<sup>34</sup>

As a factory engaged in the production of methyl bromide, the Smarden Rentokil operation required a licence under the Alkali Acts administration, which it did not possess. When the Ministry of Agriculture pursued Rentokil’s administrative oversight as one possible means of pollution prevention, they confronted the limitations of the Alkali Acts administration. R.A.J. Mahler, Deputy Chief Alkali Inspector, informed the Ministry of Agriculture that he had issued a certificate to Rentokil at Smarden for the production of methyl bromide on 28 July 1963 – directly in the midst of the incident. He had, he explained, no choice: the factory was equipped with soda scrubbers and was, therefore, in possession of the ‘best practicable means’ to prevent the omission of any noxious or offensive gases.<sup>35</sup> By the end of July, however, Rentokil had taken the decision temporarily to suspend production at Smarden.<sup>36</sup> Consequently, the decision to issue a certificate was based upon possession of requisite technology rather than an assessment of any operational emissions.

Smarden was more than a struggle between city and country, or industry and agriculture: it was a reminder of the tensions between government and industry, and voluntarism and statutory regulation in the control of pollution. In the midst of the

Smarden Affair, on 10 September 1963, Keith Joseph elected to celebrate the centenary of the passage of the first Alkali Act. A celebratory reception would be warranted irrespective of Smarden, but the wording of Joseph's invitation was telling: 'the present seems to be a suitable occasion to call attention to the very considerable efforts made by industry, generally, in collaboration with the Alkali Inspectorate to keep air pollution to a minimum – this in spite of the problems as posed by constantly changing technical developments and vastly increased output'.<sup>37</sup>

Joseph consistently characterized the Smarden incident as a one-off that could not have been foreseen.<sup>38</sup> By the time that he made this strong declaration to Christopher Soames, Minister of Agriculture, suspicions had shifted firmly to fluoroacetamide and water pollution. The Rivers (Prevention of Pollution) Acts, argued Joseph, were entirely adequate for prosecution and punishment of persons who pollute streams.

To a certain extent, Joseph was correct: post-war Britain did not want for legislation which regulated water purity and resources, with acts introduced in 1948, 1951, 1961, and 1963. 'If laws made rivers clean', observes Brian Clapp sardonically, 'the period 1948-74 would have marked the end of river pollution in Britain'.<sup>39</sup> Until the Rivers (Prevention of Pollution) Act of 1951, the Rivers Pollution Prevention Act, 1876 remained the principal statute for the regulation of clean river water. But this late Victorian legislation suffered the same shortcomings as smoke abatement and other nuisance regulations: meant to regulate the discharge of sewage and industrial effluent into rivers, the legislation was, bemoaned Lyon Playfair, 'so little in the interests of the public and so vastly in the interests of the polluters'.<sup>40</sup> It included the familiar 'best practicable and reasonably available means ...' clause.<sup>41</sup> Consequently, between 1930 and 1947, for example, there was less than one prosecution per year.<sup>42</sup> The 1951 statute, which replaced the act of 1876, transferred responsibility for river pollution regulation from local authorities to River Boards, which had been formally recognized and newly created in 1948. But many of the administrative weaknesses persisted: sewage and other local authorities were strongly represented on River Boards, so there remained a conflict of interest between law enforcement and river management. Moreover, the legislation instructed River Boards to address industrial, fishing, and agricultural interests; and to take account of 'all reasonably practicable steps' to prevent pollution. The Rivers (Prevention of Pollution) Act, 1961, which followed the Trade Effluents Subcommittee of the Central Water Authority Committee (1960), served to reinforce the special interests of polluting communities and businesses.<sup>43</sup>

Soames, writing to Keith Joseph, on 17 November, indicated that he was pleased the River Board had the situation under control and that they were convinced that there was no further risk of trouble from the Smarden factory.<sup>44</sup> As early as 26 July 1963, a spokesman for the Kent River Board had displayed startling self-confidence in his statement to the *Ashford Examiner*: 'We are satisfied that whatever reason for complaint there may have been about the discharge of trade effluent into a ditch earlier in the year, those reasons do not exist now'.<sup>45</sup> Nevertheless, Soames expressed concern that such an incident could occur, and he wished to give the public reassurance that precautions were being introduced so that there would not be a repetition. Perhaps, he suggested, the River Board needed to extend the scope of its water analyses. Joseph responded by insisting that, although 'a most distressing story', it was not one that could have been predicted or prevented.<sup>46</sup> The River Board could not have known of the possible dangers because they

were unaware of processes carried on by factories in their areas and of the chemicals involved. Moreover, they could not prevent ‘accidental or careless spilling’. The only recourse was legal action: ‘So far as the law is concerned the Rivers (Prevention of Pollution) Acts make ample provision for the prosecution and punishment of the people who pollute streams. We do not need more legislation’. But as he then acknowledged, the only public body which could undertake legal action was the River Board; and they had elected not to on the grounds that they had insufficient evidence to ensure success.

A.G. Stirk, Clerk of the Kent River Board, explained, on 9 October 1963, why his organization had not mounted action against Rentokil.<sup>47</sup> If action was taken, it would be through Section 2 (1)(a) of the Rivers (Prevention of Pollution) Act, 1951, which would require them to establish that ‘poisonous, noxious or polluting’ matter had entered the stream, and that the company had caused or knowingly permitted the material to enter it. The Board first became aware of an effluent on 20 May 1963, when Douglas Good informed them of the matter. The Board’s District Inspector visited Great Omenden Farm the day after receipt of Good’s letter to take samples. But it was not until Good’s second letter that the Board was aware that the factory produced methyl bromide and fluoroacetamide. Consequently, they did not test for fluoride on the initial visit. As a civil servant later observed, it seemed astonishing that the Board Inspector had not enquired what was manufactured at the factory when he visited it to take samples.<sup>48</sup> By the time that the Board tested subsequent samples for fluoride, the concentrations were not great enough to constitute poisonous, noxious or polluting levels. Furthermore, the company denied that they had ever dumped on their premises any waste which had arisen from the manufacture of fluoroacetamide; and they denied any knowledge of this being done by an employee without their authority. Under these circumstances, explained Stirk, the Board could not hope to mount a successful prosecution. Several months earlier, the River Board had advised the West Ashford Rural District Council to deny Rentokil planning permission to manufacture methyl bromide: ‘notwithstanding the controls exercisable in the Rivers Prevention of Pollution Act the processes and toxic chemicals used, involving such serious risk of pollution, permission should not be given’.<sup>49</sup> According to the 1951 and 1961 acts, any industry discharging a new effluent into a stream would require the permission of the relevant River Board. Admittedly, the immediate context was methyl bromide production, but the memorandum noted that the factory also produced fluoroacetamide. In early October 1963, the West Ashford Rural District Council denied Rentokil permission to manufacture the toxic chemical fluoroacetamide.<sup>50</sup> Despite best efforts to contain this incident as a deviation from planned management, by the time that the local Council took action, the events at Smarden had fuelled broader concerns for the health of the countryside and of humans. These concerns were articulated within a Carsonian framework.

## **FLUORIDE AND PUBLIC HEALTH**

Drawing readers’ attention to toxic hazards, Carson effectively fused the pre-existent public health and pollution concerns of urban and industrial reformers to ecological sensitivities. The twentieth century had ushered in an ‘epidemiological transition’ from a pre-industrial demographic regime, dominated by epidemic infectious diseases, to modern patterns of death from chronic degenerative diseases. At the same time, the rise of scientific medicine generated an elevated awareness of disease and illness.<sup>51</sup> Written under the pseudonym Lewis Herber, Murray Bookchin’s *Our Synthetic*

*Environment* placed this epidemiological transition in the post-Second World War context. Bookchin's book, which was published in the same year as *Silent Spring*, argued that concerns for infectious diseases had been replaced by environmentally related public health problems.<sup>52</sup> The events at Smarden also forced people in Britain to confront the possible human health risks arising from the use of toxic pesticides.

From a very early stage in their investigations about Smarden, the central government maintained that there was no threat to human health.<sup>53</sup> In the early days, Deedes informed his fellow cabinet ministers that locals accepted this point.<sup>54</sup> But if this was the initial local response, it did not last long. More cows began to sicken and die after July. H.M. Elliott, Medical Officer to the Ministry of Health, visited Smarden on 20 August, and gave the Rural District Council and local medical officers assurances that there was 'no risk to the health of humans', and that he could see no danger to cattle, or from their milk, based on the current levels of fluoride found in the ditch water.<sup>55</sup> Four more cattle, from the Julls' farm which was next to the Rentokil factory, had to be slaughtered at a knacker's yard one week later.<sup>56</sup> During this process, a dog consumed some of the offal from one of the cows and died. On a veterinarian's advice, two more dogs were fed liver and spleen from the cattle, as a diagnostic test, and subsequently died. Dr Marshall, the local Medical Officer of Health, immediately stopped the sale of any further milk from the Julls' herd, and telephoned Elliott to inform him of his actions. By the end of September, the 11 remaining cows from the Julls' initial herd of 26 had to be destroyed: the carcasses were burned on the Julls' farm on 30 September, and were left in a field, where they were inspected by the Deputy Divisional Veterinary Officer of the Animal Health Division on 9 October. He satisfied himself that the ashes were not in a water catchment area and that animals could not gain access to them. He then suggested that the Julls don protective gear and bury the ashes to a depth greater than six feet. Rather chillingly, he concluded his internal report to the Ministry of Agriculture, Fisheries, and Food (MAFF) with the following statement: 'The knowledge or assumption of non-destruction by cremation of the substance fluoroacetamide was held but not raised by or conveyed to the owner'.<sup>57</sup>

Another fluoroacetamide incident in Merthyr Tydfil, Wales, in the same month, compounded public concerns. Moreover, because it involved the death of domestic pets - approximately 75 dogs and cats – it effectively shifted the focus of fluoroacetamide toxicity from farmers' fields to people's homes. The Merthyr Tydfil incident was traced to the consumption of the flesh of a single pony, which was rendered into pet food following its death at a rubbish dump, where it likely ingested a fluoroacetamide rat poison.<sup>58</sup> The local veterinary surgeon, D.H. Phillips, was aware of the incident at Smarden and had been in contact with Good, so the Veterinary Laboratory at Weybridge was consulted, and determined that the pony and dogs had died from an organic fluoride poison. On 2 October 1963, BBC Radio News conducted an interview with Dr Barnes, Director of the Toxicology Research Unit within the Medical Research Council, to inform the public about fluoroacetamide.<sup>59</sup> Barnes emphasized the variability of toxicity among different species of animals, dogs being the most sensitive. When questioned whether it could kill a human being, he confirmed that it could if the dose was large enough. Perhaps more significantly, he went on to summarize the research of Sir Rudolph Peters, who demonstrated that fluoroacetamide only became poisonous once it was metabolized by the body. As an internal MAFF memorandum made clear a few days

later, people were becoming more alert to the ‘risk of “chain poisoning” .... It could be from cow to milk to child’.<sup>60</sup> Nevertheless, a Ministry of Health official concluded that ‘a precise assessment of the human risk is presumably not wanted in the report of what has happened at Merthyr Tydfil and Smarden’.<sup>61</sup>

When Henry Farris, an employee of the Rentokil factory in Smarden suffered a mystery illness in January 1964, fears of human toxicity grew.<sup>62</sup> Farris, who had worked on the production of fluoroacetamide and the subsequent clearing of ditches, complained of a tired drunken feeling that sent him reeling about his house. Farris, who said he was ‘very worried’, was sent to the National Poisons Information Centre at Guy’s Hospital, London for testing, despite Rentokil’s skepticism. A spokesman for the company dismissed the illness as a ‘psychological’ episode in the wake of a bout of bronchitis. The implication was that adverse publicity surrounding the death of further cows and dogs associated with the Julls’ fields, in December and January, had misled Farris to assume that his bronchitis was fluoroacetamide poisoning. One month later, the same Rentokil spokesman complained, ‘at the moment the community is so alive with rumours that if a cat dies ten miles away, it is because of fluoroacetamide’. Norman Jull, one of the affected dairy farmers, informed a local journalist that he ‘had seen a medical report on Mr Farris, which stated he was suffering from “bronchial pneumonia and fluoroacetamide poisoning”’.<sup>63</sup> This report was likely that of local medical doctor, E.W. Brentnall, who remained convinced of ‘chronic poisoning’, despite the negative findings of Guy’s. By the end of January, the West Ashford Rural Council was sufficiently concerned to demand a meeting with Ministry of Agriculture officials. Major A.J. Palmer, a former Council chairman, declared, ‘it will not be until a few people die that anything will be done’. An ‘evil spell’ had truly fallen on the Garden of England, as the competing expertise of government and academic scientists, medical doctors, and veterinary surgeons became publicly visible.

Furthermore, public health concerns regarding fluoroacetamide were articulated within the context of post-Second World War disputes surrounding the science of water fluoridation. After 1952, there was a concerted push from American and British medical, dental, and public health authorities to add the element fluorine, in its compound form of fluoride, to drinking water to reduce tooth decay (caries) in children. The ensuing public health controversy has been long-lived and highly controversial. There were significant similarities between British anti-fluoridationists and their American counterparts, even if the British failed to embrace the hyperbolic elements of Communist conspiracy theories. Both embraced an ideology that articulated fears of an increasingly unnatural lifestyle and diet. Growing suspicion of scientific expertise – in the form of technocracy – underpinned much of the anti-fluoridationist critique as it developed and changed over the ensuing decades.<sup>64</sup> Similar themes informed the critical response to Smarden’s fluoride pollution incident.

Chris Sellers’ analysis of American anti-fluoridation disputes captures the public divergence of expertise. Whereas public health experts considered fluoride a natural constituent of tap water, anti-fluoridationists saw it as an entirely unnatural ‘mass medication for a non-communicable disease’. Contemporaries argued as to whether fluoride was a naturally occurring substance or a chemical pollutant. Furthermore, Sellers contends that ‘shared local history and experiences’ also shaped perceptions of public health and environmental concerns. In particular, he demonstrates a direct link between

anti-fluoridationists and the first public legal trial against DDT, which proved formative for Rachel Carson's determination to undertake research on *Silent Spring*.<sup>65</sup> As Gretchen Reilly has demonstrated, anti-fluoridationists equated fluoride with other 'chemical pollutants' - like mercury, lead and DDT - at least a decade before the publication of *Silent Spring*.<sup>66</sup> In the US, the officially recognized tolerance level for fluoride – 7 ppm – was used as the administrative tolerance for DDT in 1945.<sup>67</sup> Like the anti-fluoridation movement, the complexities of the Smarden incident defy easy divisions between experts and laypersons, and are better conceived as publicly visible contestation of expertise.

Although the government largely ignored fluoridation of drinking water in the context of Smarden, others felt that the subject had to be reconsidered in light of this incident. In December 1963, the *Kent & Sussex Courier* reported that the Tonbridge Rural Council had reversed its earlier decision to support the fluoridation of water supplies 'because it feels that fluoridation may be harmful to human beings'.<sup>68</sup> One month later, the East Sussex National Health Executive Council, which encompassed members of the medical and dental professions, declared their support for the fluoridation of their county's drinking water.<sup>69</sup> Writing in *The Guardian* in December 1963, Douglas Good declared:

This is no longer a parochial affair but an international one. We might take a more energetic look at pesticides in general, and in particular reconsider the wisdom of fluoridation of public water supplies.<sup>70</sup>

Good linked a parochial incident in Smarden to national and international movements. Consequently, in March 1964, he once again issued his narrative of events, but this time under the auspices of the anti-fluoridationist National Pure Water Association. Earlier, in January 1964, he informed Sir Rudolph Peters, 'Fluoridation of water supplies is keenly debated, and I cannot be convinced that it is a wise policy'. He doubted the wisdom of 'such medication'. In the same month, the *Daily Sketch* asked:

What is the Government doing to test, investigate and control the widespread use of new drugs, especially chemicals, that are being sprayed on our crops? ... What are the effects of these drugs on the food we eat? What are the effects of these drugs on our unborn children?<sup>71</sup>

Responding to recent publicity surrounding Smarden and *Silent Spring*, this particular article drew direct comparisons between the morning sickness drug thalidomide and the application of pesticides, such as fluoride and DDT. The press criticism of Smarden tapped into arguments previously rehearsed by anti-fluoridationists: toxic pesticides were nefarious 'drugs' imposed on the population in response to non-life-threatening and non-communicable 'diseases'. Coming at a time when various local councils were actively considering fluoridation of water, the Smarden fluoroacetamide incident reinforced the longstanding perception of fluorine as a toxic element; and highlighted divisions between and among experts and laypersons.<sup>72</sup>

Staff at the Ministry of Agriculture consulted prior studies on the impact of fluoride deposits on farms, in the vicinity of brick-, steel- and other industrial works, in an effort to assess toxicity. As many as a fifth of farms in these areas of England and

Wales experienced listlessness, dental lesions, lameness, and reduced milk production among their cows, all of which was attributed to the ingestion (plants, such as grass, absorb and concentrate the chemical) or inhalation of fluoride. The same briefing notes indicated that the Ministry of Health ‘are also confident that fluoridation of water supplies in areas of fluorine contamination is not dangerous to human health ...’.<sup>73</sup> The British government grappled with pollution and ‘naturally’ safe levels of inorganic and organic fluoride exposure for animal and human health in the wake of the Smarden incident.

### INSECTICIDES AND ECOLOGICAL CONSCIOUSNESS

As Carson pointed out, the synthetic insecticide industry was ‘a child of the Second World War’.<sup>74</sup> Although the insecticidal properties of DDT were discovered by Paul Müller just prior to the outbreak of hostilities in 1939, the Second World War provided this new chlorinated hydrocarbon insecticide with the perfect stage on which to showcase its properties. Wartime concerns for agricultural production and for the threat of insect vectors of disease helped to accelerate the dispersal and acceptance of DDT. Faced with a post-war industrial cache of the insecticide, the US government released DDT for civilian use in August 1945, before the completion of definitive tests for chronic toxicity. Within less than a decade, the total US production of DDT rose from approximately 10 million pounds to over 100 million pounds in 1951. By the time that Carson drew attention to the pervasive presence of this insecticide, US production had peaked at 188 million pounds. And its success spawned the introduction of twenty-five new pesticides.<sup>75</sup> By noting the close relationship between insecticides and chemical warfare, Carson had cast these substances in the role of weapons of war and mass destruction.<sup>76</sup>

Carson alerted the public to an invisible pollutant that could travel great distance, accumulate in body fats, and cause cancer, birth defects, and mutations. *Silent Spring* was a child of the Cold War. Explicitly pairing chemical insecticides with radiation, Carson wrote in the shadow of the apocalyptic mushroom clouds over Hiroshima and Nagasaki.<sup>77</sup> Through the anti-fluoridation movement, fluoride had also forged links with Cold War fears and ideology. Throughout the 1950s in the USA, anti-Communist ideology constituted a prominent strand of the anti-fluoridationist movement. Convinced that water fluoridation was an insidious weapon of mass destruction, E.H. Bronner warned: ‘REMEMBER: ATOM BOMBS DESTROY EVERYTHING, SODIUM FLUORIDE ONLY THE PEOPLE’.<sup>78</sup> Fluoride, it was argued, was a poison that would kill or mentally impair the American population, and, thus, render the nation defenseless against a Communist invasion. Unwittingly, E. Essig deployed a bovine metaphor, which might have carried resonance for the people of Smarden four years later, when he discerned an evil plan that was afoot in 1959: ‘It has revealed a Communist strategy ... of fluoridating drinking water as a means of reducing the populace to a mental state of cow-like submission’.<sup>79</sup> By the time that the fictional Colonel Jack Ripper, in *Dr Strangelove: or How I Learned to Stop Worrying and Love the Bomb* (1964), initiated a nuclear attack on the Soviet Union because he was convinced that Communists were using fluoridation to poison the USA, the heyday of Communist conspiracy theories had passed. But anti-fluoridation and its similarities to nuclear fallout lingered. Writing to the *Sunday Telegraph* in late September 1963, food critic Egon Ronay expressed dismay over the Smarden poisonings. ‘What is the good’, he asked, of philosophical bottoms sitting down

solemnly in the hope of stopping atomic fall-out while this horrific abuse of sprays with as yet untried consequences on human food pours money into chemical manufacturers' pockets?<sup>80</sup> Douglas Good, who played such a key role in the Smarden incident, had practised in South Africa, from 1948-1952, with D.G. Steyn, with whom he remained in contact. Steyn had subsequently become Chief Research Officer of the Life Science Division of the Atomic Energy Board of the Republic of South Africa. By February 1964, Good was convinced that fluoroacetamide might, itself, contain radioactive properties that were, at present, undetectable. He, therefore, began to promote the construction of a concrete tomb on the polluted land in opposition to the government's intention to dump the contaminated soil at sea.<sup>81</sup>

Fluoroacetamide was subsumed within the broader discussion of insecticides. By February 1964, the Smarden incident had generated sufficient interest and concern for *New Scientist* to elicit a contribution on fluoroacetamide from Sir Rudolph Peters, a renowned Cambridge scientist. He observed:

It is not often that a simple chemical substance becomes headline news, but this has happened recently with fluoroacetamide, a simple amid of fluoroacetic acid. Its prominence has arisen through the fact that it has been let loose from a factory site upon a farm at Smarden in Kent .... Fluoroacetamide was first studied in chemical detail by B.C. Saunders and colleagues during the Second World War. This was done as a defense measure ....<sup>82</sup>

Fluoroacetamide first arose out of Second World War research into its potential as a weapon. Peters contended that a 'whale' of further research would be required to understand the full environmental impact of potential and existent insecticides; but he urged the necessity of their continued use to feed the growing population and to protect humankind from insect-borne diseases.<sup>83</sup> Like many other scientists, Peters placed insecticides within neo-Malthusian concerns for feeding a burgeoning population. He thereby elided the disciplining of the environment with that of the 'species body'. Pesticides were essential tools for the rational management of the human population.

But the Smarden incident forced people to confront the extent and propriety of the use of chemical insecticides in Britain. When the Infestation Control Laboratory of MAFF analysed one of the Julls' dead cows, 'Melba', for evidence of chlorinated pesticide residue in late August, it found very small traces of Aldrin, BHC, Dieldrin, DDT, DDE, DDD (Rothane), Endrin, Heptachlor, and Heptaclor epoxide.<sup>84</sup> As a MAFF civil servant complained in another context, improved techniques permitted detection of minuscule – and perhaps insignificant – quantities of insecticides. Nevertheless, findings like those for the Julls' cows demonstrated the pervasiveness of organic pesticides in the 'Garden of England' by 1963.<sup>85</sup> Addressing an audience in Maidstone, B.D. Moreton, a Ministry of Agriculture entomologist, estimated that 1,000 tons of DDT had been used in Kent since its introduction about fifteen years earlier.<sup>86</sup> He urged greater caution in its use and application after declaring himself 'terrified' by the quantity thus far deployed. Other critics complained that, generally, British experts had argued that Carson's arguments did not apply to the British context. Smarden, they observed, proved this patently untrue. Furthermore, Americans had withheld approval for fluoroacetamide.<sup>87</sup> In the case of

fluoroacetamide, Britain stole a march on the US in the dissemination of a deadly weapon of war as an insecticide.

Prior to the publication of *Silent Spring*, the people of Britain had been alerted to the possible dangers surrounding the use of organo-chlorine and organo-phosphorous insecticides, which were widely disseminated after 1945. Following the death of seven agricultural workers between 1946 and 1950, a working party was established, under the chairmanship of Solly Zuckerman, to make recommendations ‘for the promotion of the safety of workers in the agricultural use of substances toxic or harmful to human beings’. The remit of this working party was widened in 1951 and 1953 to include an assessment of the risks to consumers (of food treated with agricultural chemicals) and to wildlife. The Inter-Departmental Advisory Committee on Poisonous Substances used in Agriculture and Food Storage, which was created in 1954, arose out of this governmental activity; and a voluntary notification scheme was implemented in 1957. The Pesticides Safety Precautions Scheme was truly ‘a typical British invention’: it relied on the Association of British Manufacturers of Agricultural Chemicals (ABMAC) to notify the Ministry of Agriculture, Fisheries, and Food of every new chemical insecticide, herbicide, and fungicide, and of each new use of any existing one; and to provide toxicological reports. The Advisory Committee would, in turn, consult with a Scientific Sub-Committee, composed of specialist panels and representatives of voluntary bodies and specialist institutions (excluding manufacturers), to verify the properties and toxicity of the pesticide, and to issue safety recommendations.<sup>88</sup>

Toxicology, however, poses significant difficulties. Different species of animal often have widely divergent reactions to the same poison, so it can be dangerous to presume that one species will react in a certain way after experimental trials on a different one.<sup>89</sup> Humans, for example, can excrete sodium fluoroacetate whereas dogs cannot. Consequently, this particular chemical is far more toxic to dogs than humans.<sup>90</sup> Under these circumstances, chemicals were frequently released without a proper grasp of their environmental impact. Within the voluntary scheme, chemical manufacturers could justify lack of control on insufficient knowledge: a chemical was ‘innocent until proven guilty’.<sup>91</sup>

The possible shortcomings of this approach became obvious in Britain between 1956 and 1961. A significant number and variety of birds were found dead. These were principally seed-eating birds, woodpigeons, pheasants, and partridges; and eastern England was disproportionately affected. In 1959-60, 1,300 foxes and a number of farm dogs, cats and badgers were also found dead. Occurring in the breadbasket of England, and affecting seed-eating birds, this deadly episode was soon attributed to dieldrin, which had been used as a seed dressing. This chemical was one of the cyclodiene group of chlorinated hydrocarbons, which also included aldrin, heptachlor, endosulphan and endrin. After the mid-1950s, dieldrin was widely used as a seed dressing against wheat bulb fly in Britain. The work of the Nature Conservancy and voluntary bodies, such as the Royal Society for the Protection of Birds, the British Trust for Ornithology, and the Game Research Association, identified dieldrin as the culprit of mass poisoning among Britain’s wildlife. The government responded with a voluntary seasonal moratorium on the application of dieldrin seed dressings. Although farmers could safely use the chemical in the autumn, when it was least dangerous to birds, they should refrain from applications on spring-sown wheat.<sup>92</sup>

Arriving in the wake of the dieldrin episode, Carson's *Silent Spring* fell on fertile ground in the UK. Those persons who contended that the book did not apply to Britain missed Carson's overarching argument by focusing exclusively on DDT. Admittedly, most experts in Britain maintained that DDT had not had the same sinister impact in the UK as it had in the USA. But this was not a result of a superior regulatory regime: it was indicative of different agricultural environments and, therefore, less need for mass spraying of DDT. More broadly, the dieldrin episode proved that Britain could not ignore the clarion call to heed the ecological dangers of mass applications of chemical pesticides. Dieldrin, after all, was far more toxic than DDT, as Carson had pointed out when she dealt with the subject in *Silent Spring*.<sup>93</sup> When the use of toxic chemicals was debated in the House of Lords in the spring of 1963, copies of *Silent Spring* sat beside both dispatch boxes, and the book was a point of reference for almost every speaker.<sup>94</sup>

The environmental impact of a toxic chemical – dieldrin – generated increasing ecological consciousness in Britain. Beginning in 1961, the government officially consulted ecologists as part of the screening process for potential pesticides.<sup>95</sup> By placing her critical examination of the pervasiveness of toxic chemicals within an ecological narrative, Carson offered readers, who were already familiar with the dieldrin episode, a clear explanatory framework for further discussion and debate. In March 1963, *Punch* published a cartoon that humourously captured ecological sensibilities: as two men stood over a dead dog in a rural setting, one explained to the other: 'This is the dog that bit the cat that killed the rat that ate the malt that came from the grain that Jack sprayed'.<sup>96</sup>

Perhaps unsurprisingly, when the industrial waste spill at Smarden came to light in 1963, it was located in a Carsonian ecological frame. Reflecting on the 'Smarden affair' as 'by far the most disturbing' example of 'the "slow but steady poisoning of the whole countryside"', an editorial in the *Kent & Sussex Courier* opined:

The whole trouble with agriculture today – with its massive use of artificial aids for boosting crops and yields, and its increasing reliance on insecticides and pest controls of which all too often little is really known – is that man has chosen to work against rather than with Nature.

Science marches on, its brilliant exponents blinded, it seems, to the simple but absolute truth that Nature must achieve a balance. Man's role is to co-operate with, not to try to control Nature. In place of methods of destruction, he needs to learn how to utilize her vast resources for restoration and to turn the full light of his research upon the infinitely more promising science of ecology.<sup>97</sup>

Similarly, when the deaths of dogs and cats at Merthyr Tydfil came to light, a correspondent to *The Guardian* attacked the irresponsibility of the Ministry of Agriculture. After further noting the Ministry's cavalier attitude to aldrin and dieldrin, he continued:

What folly is this that flies in the face of evidence submitted to the Ministry over the years? Even Rachel Carson's findings and grim warnings (based on five years' research) were dismissed in official circles as being irrelevant to our own society. Is it being too optimistic that these murderous poisons will be withdrawn before the American experience is repeated here?<sup>98</sup>

In 1963-64, the events at Smarden and Merthyr Tydfil were subsumed within a Carsonian ecological critique of pesticides, which carried resonances of the earlier dieldrin poisonings in Britain. Although the UK government had already committed itself to some ecological expertise, it remained principally out of the public gaze. Carson and the fluoroacetamide poisonings introduced a popular ecology, with which critics attacked the synthetic society of modernity, which was driven by government, military, and capitalism.

In their *Planet of Giants*, the writers of *Doctor Who* placed the blame for the ‘murderous poison’ firmly at the feet of industrialists. Transmitted as three episodes between 31 October and 7 November 1964, *Planet of Giants* demonstrated the growing pervasiveness of a popular ecological consciousness in Britain. Due to a malfunction of the TARDIS, the Doctor and his fellow travelers found themselves greatly reduced in size. They landed in miniaturized form in contemporary Britain, where they soon confronted a homicide and the mysterious deaths of gigantic insects. A pesticide lay at the heart of all of this murderous activity. The manufacturer of the deadly poisonous DN6 murdered the Ministry of Agriculture scientist, who was about to deny approval of the chemical as a pesticide. Before returning themselves to their proper size, the Doctor and his intrepid followers managed to foil the manufacturer’s plot both to hide the murder and to release the pesticide. Along the way, they also pondered the ecological and public health implications of poisons that killed wildlife.<sup>99</sup>

Historical accounts of the rise of environmental consciousness in the United States contend that modern environmentalism arose from the convergence of wilderness preservation and conservation, public health reform, and ecology.<sup>100</sup> The case of Smarden underlines the importance of another significant factor for the emergence of environmental consciousness in Britain: animal welfare. Arguably, Smarden did not garner considerable national attention until Good helped to expose a link with the poisoning of cats and dogs in Merthyr Tydfil.<sup>101</sup> Similarly, the subsequent death of two test cows that the government had placed on the contaminated land produced a flurry of media interest in December and January of 1963-64. Various reports noted the death of the first cow, but the *Daily Herald* produced one of the most emotive accounts, with the declaration that ‘Gert, a gentle elderly Ayrshire cow has laid down her life for science’.<sup>102</sup> As Ministry of Agriculture officials had predicted, however, it was not the story of Gert and Daisy that fueled most of the public outcry. Rather, it was the outrage of ‘dog lovers’.<sup>103</sup> To confirm the fluoroacetamide poisoning as the cause of the cows’ deaths, four dogs were fed some of the cattle flesh with fatal consequences. Newspapers reported wildly inflated numbers of dog casualties – twenty, thirty, an entire lorry load.<sup>104</sup> Indignant observers connected the senseless loss of animal life with a critique of industrial agri-business, and forced the government to act. Fluoroacetamide was banned as an agricultural and gardening insecticide, and 2,000 tons of contaminated soil was removed from Smarden in metal drums, and dumped into the sea beyond the continental shelf. This followed the earlier dumping of the contaminated water from affected ditches and ponds in the tidal waters at Dymchurch. Whereas Rentokil and the government saw the sea as an ‘ultimate sink’ for unwanted waste, their critics expressed incomprehension at the lack of ecological awareness as a persistent toxic chemical was transferred from the land to the sea.<sup>105</sup>

## CONCLUSION

When Smarden and Merthyr Tydfil converged in October 1963 to alert the British public to the potential dangers of fluoroacetamide, the BBC Home Service News called on its agricultural correspondent, Archie MacPhee, to comment:

[A]lthough it is unfortunately the case today the more we need healthy crops from the land, the more we need more insecticides, pesticides, fungicides; in fact, the whole range of agricultural chemicals. Both the official and unofficial sides of agriculture are aware of the problem. We can thank Rachel Carson and her best selling book "The Silent Spring". But I think what will have a greater effect will be the cases at Merthyr Tydfil and Smarden where defenceless animals were exposed to the subtle dangers of chemical poisoning.<sup>106</sup>

Falling in 1963, a toxic waste spill that occurred in rural Kent was quickly framed by contemporary commentators within a Carsonian ecological critique of pesticides and 'our synthetic environment'. Douglas Good effectively yoked a British tradition of animal welfare to the priorities of emergent modern environmentalism. He set both within the context of a critical exposure of divergent expert opinions on pesticides.

Good, a veterinary surgeon, played a pivotal role in elevating environmental consciousness through engagement with the Smarden Affair. Through the local and national media, he framed the Smarden story within the rubric of emergent Carsonian ecology; and he acknowledged Rachel Carson's help in his endeavour. With fellow travelers, he battled to mount his critique in the pages of the *Veterinary Record*.<sup>107</sup> Unsurprisingly, in June 1964, Good implored members of his profession to take greater heed of a recently published book: Ruth Harrison's *Animal Machines*.<sup>108</sup> Including a foreword by Rachel Carson, *Animal Machines* offered a damning exposé of factory farming, and generated intense media interest.<sup>109</sup> Harrison argued that the recent rise of factory farming meant that the Protection of Animals Act, 1911 needed to be revisited to ensure an end to inhumane practices, which were being perpetrated in the name of agricultural efficiency. When the government established a Committee of Inquiry into systems of intensive agriculture in 1964, the chairman called on Harrison for evidence and assistance. She, in turn, established her own advisory group to formulate the requested recommendations: Douglas Good was one of the seven members.<sup>110</sup>

In March 1965, when the Ministry of Agriculture seemed about to grant the Juls permission to resume 'normal cultivations', William Deedes took the opportunity to reflect upon the lessons of the 'Smarden Affair'.<sup>111</sup> After reviewing both the benefits and dangers of toxic pesticides, he speculated that compulsory registration of all pesticides would soon need to replace the existent voluntary scheme: 'In the unending struggle between liberty and the law, the law will have to gain a point here'. Although Smarden was part of the 'unending' tensions between voluntarism and statutory regulation in British governance, Deedes came closer to identifying the historical significance of his role in the episode in his memoirs three decades later.<sup>112</sup> There, he recounted the narrative of events and, incidentally, noted that, as Minister without Portfolio, he found himself struggling to coordinate a plethora of Ministries and governmental organizations. At the time, Deedes did, indeed, attempt to draw different bureaucratic strands together; and he highlighted, for his cabinet colleagues, the necessity of providing information and

guidance to affected members of the public when environmental concerns, such as those at Smarden, arose. He also acted as principal governmental liaison with the West Ashford Rural District Council, which felt greatly aggrieved by the lack of information from Westminster.<sup>113</sup> In September 1963, Deedes wrote to Christopher Soames, Minister of Agriculture:

I appreciate that litigation complicates it from the Ministry's point of view. But it would obviously be unfortunate if, in the interval, more animals perished through lack of guidance. The feeling in the locality is that somebody is doing something dangerous to animal health – the point on human health is accepted – and no authority seems to exist, even after an enquiry, to stop them. If there is no further risk, it would be helpful to say so; if there is, then clearly someone should act.

It is a tiresome business, but I think there is some danger of responsibility for immediate action falling between the three Ministries concerned.<sup>114</sup>

As Stanley Johnson noted a decade later, the rise of ecological consciousness forced 'politicians to think about the issues, more clearly than they were in the habit of doing'. And 'it forced them to question whether the political structures they had evolved were adequate to the task and, if not, what changes were needed'.<sup>115</sup> This was a cumulative process to which Smarden contributed. But through accident of circumstance, Smarden was in the Ashford constituency of Deedes, Minister without Portfolio. Deedes established a precedent: he demonstrated the desirability and efficacy of cross-departmental co-ordination in matters of the environment. By the late 1960s, Harold Wilson, Labour Prime Minister, realized the necessity of consolidating responsibilities across different governmental departments, when matters of pollution arose. Consequently, he appointed an environmental 'overlord' in 1969. Responding to the same motivations, Ted Heath, his Conservative successor, established the Department of Environment the following year, in November 1970.<sup>116</sup> This transcendence of party political divisions was indicative of the shift from ecological critique of government to environmental governmentality, which was underpinned by popular ecological consciousness.

Deedes' comments in March 1965 preceded his contribution to an adjournment debate in the House of Commons, which he had requested because of the 'wider national implications' of the events at Smarden. He reiterated his call for 'safer' regulation of 'the manufacture, distribution, and use of toxic chemicals'; but he also used parliamentary privilege to denounce Rentokil, which had recently sold its factory in Smarden to a pesticide subsidiary of Guinness:<sup>117</sup>

I must add this in fairness to everybody concerned: the mismanagement of the previous occupiers, Rentokil, was wholly responsible for this very serious industrial accident.

Indeed, it was not wholly an accident. It was caused by serious neglect .... This company made the early task of the investigators into the nature and the cause of the mysterious deaths of so many animals far more difficult than it need have been. It behaved irresponsibly, and that must be put on record.<sup>118</sup>

The events at Smarden seemed to confirm *Silent Spring*'s dire warnings about the potential environmental pitfalls of greed, and, thereby, located a criticism of capitalism amidst debates about science and governance.

As a result of the Smarden incident, the government banned the use of fluoroacetamide as an insecticide. Critics both within Parliament and beyond it realized that this measure seemed to contradict the government's contention that this was a one-off toxic waste spill, which affected domesticated animals, and had nothing to do with the threat of pesticides to the environment of the countryside. In late February 1964, the government announced that it would conduct an inquiry into the dangers of toxic industrial waste, which would encompass the chemical industry, water interests, and local authorities.<sup>119</sup> This reaction, however, stood in stark contrast to the government's response to a subsequent dangerous waste incident. In 1972, within days of the discovery of drums containing cyanide on waste ground near a children's playground in Nuneaton, Warwickshire, the government passed The Deposit of Poisonous Waste Act.<sup>120</sup> Undoubtedly, this rapid response was representative of the growing power of environmental interest groups, such as the Conservation Society, and of increased environmental consciousness, which had been spurred on by Smarden. But the lack of a similar response in Smarden was symptomatic of a different perception of the incident. Smarden had been located within a Carsonian ecological critique of pesticides.

Smaden was the 'village of fear' over which hung 'the threat of death ...for nine months'.<sup>121</sup> But like the persistent pesticides that drew the ire of Carson, the memory of Smarden lingered as a cautionary tale about science, government, and the industrialization of agriculture. In 1985, the first case of bovine spongiform encephalopathy (BSE) was diagnosed in Smarden, Kent and the county subsequently experienced a disproportionate number of cases. Twelve years later, a cluster of cases of new variant Creutzfeldt-Jakob Disease led to speculations that this prion-based human form of BSE was caused by excessive exposure to pesticides, such as those spilled in Smarden in 1963.<sup>122</sup> Conflicting expertise surrounding public health, agriculture, and the environment starkly demonstrated the struggle to manage rationally the environment - from fluoroacetamide to BSE.

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<sup>1</sup> F.D.T. Good, ‘Pesticides and the Smarden Affair’, *Mother Earth*, 13 (April 1964), 87-93. For a summary of the case from the perspective of environmental toxicology, see: R. Allcroft and J.S. Jones, ‘Fluoroacetamide Poisoning. I. Toxicity in Dairy Cattle: Clinical History and Preliminary Investigations’, *The Veterinary Record*, 84 (1969), 399-402; and R. Allcroft, F.J. Salt, R.A. Peters, and M. Shorthouse, ‘Fluoroacetamide Poisoning. II. Toxicity in Dairy Cattle: Confirmation of Diagnosis’, *The Veterinary Record*, 84 (1969), 403-09.

<sup>2</sup> W. F. Deedes, *Dear Bill: W. F. Deedes Reports* (London: Macmillan, 1997), pp. 188-205 (quotations from pp. 188 and 191). As the title of the book indicates, Deedes is, perhaps, best remembered as the recipient of the satirical, imaginary ‘Dear Bill’ letters, from Denis Thatcher, which were published by *Private Eye*. Deedes was, indeed, a confidant and golfing partner of Denis Thatcher. See pp. 278-80. In addition, see Andrew O’Hagan, ‘Maggie’, *The New York Review of Books*, 60 (23 May 2013), 18-20 (18).

<sup>3</sup> William F. Deedes, ‘The Smarden Poisoning Episode Reminded Me Irresistibly of a Novel: Compulsory Registration of Pesticides in Sight’, *Kent Messenger*, 5 March 1965, National Archives (hereafter NA): MAF 113/619.

<sup>4</sup> John Coleman-Cooke, *The Harvest that Kills: An Urgent Warning about Man’s Use of Toxic Chemicals on the Land* (London: Odhams Books Limited, 1965), p. 120.

<sup>5</sup> Stanley P. Johnson, *The Politics of Environment: The British Experience* (London: Tom Stacey, 1973), pp. 16-17. For Carson, see pp. 73-75.

<sup>6</sup> Rachel Carson, *Silent Spring* (1962; rept. Boston: Houghton Mifflin, 1987), p. 9

<sup>7</sup> For the size of Smarden, see Jenni Rodger, *Smarden: A Pictorial History* (Rainham, Kent: Meresborough Books, 1982), p. 4.

<sup>8</sup> J.S.T. Jones to R. Allcroft, 17 July 1963, NA: MAF 35/1017.

<sup>9</sup> Rodger, *Smarden*, p. 6.

<sup>10</sup> Douglas Good, quoted in ‘The Night in June a Foxhound Went Mad. The Fluoroacetamide Story. Vet Tells How Poison Paralyses a Smarden Farm’, *Kent & Sussex Courier*, 31 January 1964, p. 11. Reprinted as F.D.T. Good, ‘Pesticides and the Smarden Affair’, *Mother Earth*, 13 (April, 1964), 87-93 (91).

<sup>11</sup> See Rodgers, *Smarden*, pp. 4, 28-32.

<sup>12</sup> J.D. Casswell to The Secretary to the Ministry of Agriculture & Fisheries, 22 July 1963, NA: MAF 35/1017, 161; A.G. Stirke, to McQuail, 9 October 1963, NA: MAF 35/1017; D.S. Papworth, ‘Investigation of Alleged Poisoning to Farm Livestock at Smarden, Kent’, 2 August 1963, NA: MAF 35/1017; and ‘The Night in June a Foxhound Went Mad. The Fluoroacetamide Story. Vet Tells How Poison Paralyses a Smarden Farm’, *Kent & Sussex Courier*, 31 January 1964, p.11.

<sup>13</sup> Christopher Soames [Memorandum], 8 October 1963, NA: HLG 131/326; and “Poison” Land to be Dumped: Second Test Cow Dies on Stricken Farm’, *Kent & Sussex Courier*, 24 January 1964, p. 3. Tritox was used to eliminate greenfly, blackfly, whitefly, leaf miner, frog hoppers, thrips, etc. from ornamental plants. Megatox was sprayed on broad beans, brussel sprouts, strawberries, and sugar beet. See advertisement, ‘Tritox: The New Way to Protect Your Plants from Greenfly and Blackfly’, NA: HLG 131/326; and Coleman-Cooke, *The Harvest that Kills*, pp. 124-25.

<sup>14</sup> Harrison, *Seeking a Role*, p. 175.

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- <sup>15</sup> See Martin Brooks et al, *Smarden 2000* (Smarden: Smarden Local History Society, 2000), pp. 17-18.
- <sup>16</sup> See Philip Conford, *The Origins of the Organic Movement* (Edinburgh: Floris Books, 2001), pp. 28-43; and David Grigg, *The World Food Problem*, 2<sup>nd</sup> edition (Oxford: Blackwell, 1993), pp. 120-27.
- <sup>17</sup> See Raymond Williams, *The Country and the City* (London: The Hogarth Press, 1985); and James Winter, *Secure for Rash Assault: Sustaining the Victorian Environment* (Berkeley: University of California Press, 1999), especially pp. 166-88 for the long-standing tensions between the 'country and the city'.
- <sup>18</sup> 'Smarden Factory: Council's Order', *Kentish Express*, 16 August 1963, NA: MAF 35/1017, 128.
- <sup>19</sup> W.G. Hoskins, *The Making of the English Landscape* (1955; rept. London: Penguin Books, 1985), p. 299. Hoskins helped to establish the sub-discipline of 'landscape history' in the UK.
- <sup>20</sup> David Matless, *Landscape and Englishness* (London: Reaktion Books, 1998), pp. 279-80. In addition, see Meredith Veldman, *Fantasy, the Bomb, and the Greening of Britain: Romantic Protest, 1945-1980* (Cambridge: Cambridge University Press, 1994).
- <sup>21</sup> D.S. Papworth, 'Investigation of Alleged Poisoning to Farm Livestock at Smarden, Kent', 2 August 1963, NA: MAF 35/1017; and 'The Night in June a Foxhound Went Mad. The Fluoroacetamide Story. Vet Tells How Poison Paralyses a Smarden Farm', *Kent & Sussex Courier*, 31 January 1964, p.11 (see subsection entitled, 'A Shabby Building').
- <sup>22</sup> G.H. Lowe to F.D.T. Good, 15 July 1963, NA: MAF 35/1017, 131B.
- <sup>23</sup> See 'Smarden Factory: Council's Order', *Kentish Express*, 16 August 1963; and Keith Joseph to William Deedes, 26 September 1963, NA MAF 35/1017, 128, 181.
- <sup>24</sup> [Typescript] BBC 10 O'Clock Programme (Home Service News), 2 October 1963, NA: MAF 35/1017, 186
- <sup>25</sup> B.W.J. Wulff, to F.D.T. Good, 18 July 1963. NA: MAF 35/1017, 131B.
- <sup>26</sup> Keith Joseph to W. Deedes, 26 September 1963, NA: MAF 35/1017, 181. In addition, see West Ashford Rural District Council to the Secretary, MAFF, 23 August 1963, NA: HLG 131/326.
- <sup>27</sup> D.S. Papworth, 'Investigation of Alleged Poisoning to Farm Livestock at Smarden, Kent', 2 August 1963, NA: MAF 35/1017
- <sup>28</sup> 'Council Take Action on Smarden "Smell"', *Kent Messenger*, 16 August 1963, NA: MAF35/1017, 128
- <sup>29</sup> J.D. Casswell to the Secretary to the Ministry of Agriculture and Fisheries, 22 July 1963. NA: MAF 35/107, 161
- <sup>30</sup> See Ben Pontin, 'The Secret Achievements of Nineteenth Century Nuisance Law: *Attorney General v Birmingham Corporation* (1858-95) in Context', *Environmental Law and Management*, 19 (2007), 271-90.
- <sup>31</sup> B.W. Clapp, *An Environmental History of Britain since the Industrial Revolution* (Harlow, Essex: Longman, 1994), pp. 24, 32-37. To place the Alkali Acts in the broader context of legislative responses to smoke pollution, see Peter Thorsheim, *Inventing Pollution: Coal, Smoke, and Culture in Britain since 1800* (Athens, Ohio: Ohio University Press, 2006), pp. 110-31. On the London smog of 1952, see *ibid.*, pp. 159-73;

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and Peter Brmblecombe, *The Big Smoke: A History of Air Pollution in London Since Medieval Times* (London: Routledge, 1987), pp. 161-78.

<sup>32</sup> Roy M. MacLeod, 'The Alkali Acts Administration, 1863-84: The Emergence of the Civil Scientist', *Victorian Studies*, 9 (1965), 85-112 (86).

<sup>33</sup> *Chemical News*, 6 (1862), 202, as quoted in Roy M. MacLeod, 'The Alkali Acts Administration, 1863-84: The Emergence of the Civil Scientist', 87.

<sup>34</sup> Clapp, *An Environmental History of Britain*, p. 32.

<sup>35</sup> R.J. Mahler to Miss J.F. Maddox, 28 August 1963, NA: MAF 35/1017, 133

<sup>36</sup> John Edwardson to R. Crump, Appendix 11, NA: HLG 131/326.

<sup>37</sup> Keith Joseph to Christopher Soames, 10 September 1963, NA: MAF 35/1017, 150. The Alkali Act passed July 1863. See MacLeod, 'The Alkali Acts Administration, 1863-84', p. 90.

<sup>38</sup> Keith Joseph to Christopher Soames, 26 November 1963, NA: HLG 131/326

<sup>39</sup> Clapp, *An Environmental History of Britain*, pp. 93-94.

<sup>40</sup> Lyon Playfair quoted in Anthony S. Wohl, *Endangered Lives: Public Health in Victorian Britain* (London: Methuen, 1984), p. 248. In addition, see Bill Luckin, *Pollution and Control: A Social History of the Thames in the Nineteenth Century* (Bristol: Adam Hilger, 1986), pp. 158-76 for 'the failure of national legislation'.

<sup>41</sup> John Sheail, 'Public Interest and Self-Interest; The Disposal of Trade Effluent in Interwar England', *Twentieth Century British History*, 4 (1993), 149-70 (151). And see John Hassan, *A History of Water in Modern England and Wales* (Manchester: University of Manchester Press, 1998), pp. 85-125; and Roger Bate, *Saving Our Streams: The Role of the Anglers' Conservation Association in Protecting English and Welsh Rivers* (London: The Institute of Economic Affairs, 2001), pp. 78-106.

<sup>42</sup> Clapp, *An Environmental History of Britain*, p. 95.

<sup>43</sup> John Sheail, "Never Again": Pollution and the Management of Watercourses in Postwar Britain', *Journal of Contemporary History*, 33 (1998), 117-33 (see, especially, 130-32).

<sup>44</sup> Christopher Soames to Keith Joseph, 17 November 1963, NA: HLG 131/326.

<sup>45</sup> 'Smarden Factory Health Menace? Mystery of Dairy Herd Casualties', *Ashford Examiner*, 26 July 1963, NA: MAF 35/1017 131B

<sup>46</sup> Keith Joseph to Christopher Soames, 26 November 1963, NA: HLG 131/326.

<sup>47</sup> A.G. Stirk, Clerk of the Kent River Board, to Paul McQuail, 9 October 1963, NA: MAF 35/1017, 192/2.

<sup>48</sup> P.N.N. Moore to Paul McQuail, 30 October 1963, NA: MAF 35/1017, 215d.

<sup>49</sup> West Ashford Rural District Council to the Secretary, Ministry of Agriculture, Fisheries and Food, 23 August 1963, NA: HLG 131/326

<sup>50</sup> 'Firm to Stop Making Poison Spray', *The Kent and Sussex Courier*, 4 October 1963, p. 13.

<sup>51</sup> Paul Weindling, 'From Infectious to Chronic Diseases: Changing Patterns of Sickness in the Nineteenth and Twentieth Centuries', in Wear Andrew, ed., *Medicine in Society: Historical Essays* (Cambridge: Cambridge University Press, 1992), pp. 303-16.

<sup>52</sup> Lewis Herber, *Our Synthetic Environment* (1962; rept. London: Jonathan Cape, 1963). And see Robert Gottlieb, *Forcing the Spring: The Transformation of the American Environmental Movement*. (Washington, D.C.: Island Press, 1993) p. 87. For an excellent,

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concise introduction to Bookchin, see Janet Biehl, ‘Introduction’ to Murray Bookchin, *The Murray Bookchin Reader*, ed. Janet Biehl (London: Black Rose Books, 1999), pp. 1-12.

<sup>53</sup> Christopher Soames to W.F. Deedes, NA: HLG 131/326: ‘I understand that the Ministry of Health are satisfied that there is no danger to human health’.

<sup>54</sup> W.F. Deedes to Christopher Soames, 18 September 1963, NA: HLG/326. However, compare this assurance with a report in the *Kentish Express*, which indicated that a ‘round robin’ [petition] had been sent to the West Ashford Rural District Council from five households in the area of Smarden, expressing concern for the health of animals *and humans*. See ‘Smarden Factory: Council’s Order’, *Kentish Express*, 16 August 1963, NA: MAF 35/1017, 128.

<sup>55</sup> H.M. Elliott, ‘Smarden – West Ashford Rural District Council. Poisoning of Animals by Effluent from Midox Factory. Minute’, 23 August 1963, NA: MAF 35/1017, 147.

<sup>56</sup> H.M. Elliott, ‘Discharge from Midox Works, Smarden’, 4 September 1963, NA: MAF 35/1017, 146; and J. Steele, Divisional Veterinary Officer, Midox Chemical Division, Rentokil Laboratories, Smarden, Kent Further Report Re: Jull, Robert’s Farm, Smarden, Kent’, 12 September 1963, NA: MAF 35/1019, 140.

<sup>57</sup> ‘Further Report Re: Jull, Robert’s Farm, Smarden, Kent by John Edwardson, Deputy Divisional Veterinary Officer, Animal Health Division, Maidstone, Kent’, 9 October 1963, NA: MAF 35/1017

<sup>58</sup> D.H. Phillips, ‘Letters to the Editor. “Mystery” Poisoning of Animals’, *The Veterinary Record*, 75 (26 October 1963), 1124. Phillips, a veterinary surgeon in Merthyr Tydfil, noted that he was working in concert with Douglas Good. In addition, see ‘Poisoning of Animals at Merthyr Tydfil and Smarden. Report to Minister’, NA: HLG 131/326; and J. Hensley, ‘Poisoning of Animals at Merthyr Tydfil and Smarden. Draft Report to Minister’, 3 October 1963, NA: HLG 131/326.

<sup>59</sup> [Typescript of Radio News Interview], ‘BBC Radio News’, 2 October 1963, NA: MAF 35/1017, 186.

<sup>60</sup> J.G. Carnochan to J. Hensley, 18 October 1963, NA: MAF 35/1017, 210.

<sup>61</sup> G.O. Lace, ‘Poisoning of Animals in Merthyr Tydfil and Smarden Minute’, 3 October 1963, NA: MAF 35/1017, 185.

<sup>62</sup> ‘Poison Factory Man Ill’, *Kent & Sussex Courier*, 17 January 1964, p. 6.

<sup>63</sup> ‘Ocean Dump for Poison Soil. 2,000 Tons to go in Deep Water’, *Kent & Sussex Courier*, 7 February 1964, p. 13.

<sup>64</sup> See Gretchen Ann Reilly, ““This Poisoning of Our Drinking Water”: The American Fluoridation Controversy in Historical Context, 1950-1990” (Unpublished PhD Thesis, The George Washington University, 2001); Amy C. Whipple, ““Into Every Home, Into Every Body”: Organicism and Anti-Statism in the British Anti-Fluoridation Movement, 1952-1960”, *Twentieth Century British History*, 21 (2010), 330-49; Brian Martin, ‘Analyzing the Fluoridation Controversy: Resources and Structures’, *Social Studies of Science*, 18 (May 1988), 331-63; and Joe Mullen, ‘History of Water Fluoridation’, *British Dental Journal*, 199 (2005), 1-4.

<sup>65</sup> Christopher Sellers, ‘The Artificial Nature of Fluoridated Water: Between Nations, Knowledge, and Material Flows’, in Gregg Mitman, Michelle Murphy, and Christopher

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Sellers, eds., *Landscapes of Exposure: Knowledge and Illness in Modern Environments*, *Osiris*, 2<sup>nd</sup> series, 19 (2004), 182-200.

<sup>66</sup> Reilly, “This Poisoning of Our Drinking Water”, pp. 126-27, 150-53.

<sup>67</sup> Benjamin Rose and Steven Amter, *The Polluters: The Making of Our Chemically Altered Environment* (Oxford: Oxford University Press, 2010), p. 56.

<sup>68</sup> ‘Now It Is “No” to Fluoride’, *Kent & Sussex Courier*, 6 December 1963, p. 5.

<sup>69</sup> ‘Fluoride in the Water? “Yes” Say the Medical Men’, *Kent & Sussex Courier*, 31 January 1964, p. 7.

<sup>70</sup> F.D.T. Good, ‘Pesticides’, *The Guardian*, 28 December 1963, p. 11.

<sup>71</sup> Fergus Cashin, ‘Medicine and Mothers-to-Be’, *Daily Sketch*, 6 January 1964, NA: MAF 35/107.

<sup>72</sup> See Timothy Cooper and Sarah Bulmer, ‘Refuse and the “Risk Society”’ for the importance of placing different scientific and lay communities in their social contexts.

<sup>73</sup> ‘Fluorine Emission from Industrial Undertakings’, NA: MAF 35/1017, 151a.

<sup>74</sup> Carson, *Silent Spring*, p. 16

<sup>75</sup> See John H. Perkins, ‘Reshaping Technology in Wartime: The Effect of Military Goals on Entomological Research and Insect-Control Practices’, *Technology and Culture* 19 (1978), 169-86; and Linda Lear, *Rachel Carson: Witness for Nature* (London: Penguin Books, 1997), p. 119. Sabine Clarke, ‘Rethinking the Post-War Hegemony of DDT: Insecticides, Research and the British Colonial Empire’, in Virginia Berridge and Martin Gorsky, eds., *Environment, Health and History* (Basingstoke: Palgrave Macmillan, 2012), pp. 133-53 includes a useful account of war-time investigations of DDT in Britain.

<sup>76</sup> Carson, *Silent Spring*, p. 16. In addition, see Edmund Russell, *War and Nature: Fighting Humans and Insects with Chemicals from World War I to Silent Spring* (Cambridge: Cambridge University Press, 2001); and Paul Julian Weindling, *Epidemics and Genocide in Eastern Europe, 1890-1945* (Oxford: Oxford University Press, 1999) for the relationships between insecticides and chemical and biological warfare.

<sup>77</sup> This is essentially the point made by Ralph H. Lutts, ‘Chemical Fallout: Rachel Carson’s *Silent Spring*, Radioactive Fallout and the Environmental Movement’, *Environmental Review* 9 (1985), 211-25.

<sup>78</sup> E.H. Bronner quoted in Reilly, “This Poisoning of Our Drinking Water”, p. 51.

<sup>79</sup> E. Essig quoted in Reilly, “This Poisoning of Our Drinking Water”, p. 54. For *Dr Strangelove*, see p. 43.

<sup>80</sup> Egon Ronay, ‘Poison Sprays’, *Sunday Telegraph*, 29 September 1963, NA: MAF 113/619.

<sup>81</sup> ‘The Night in June a Foxhound went Mad’, *Kent & Sussex Courier*, 31 July 1964, p. 11; and F.D.T Good to W.F. Deedes, 20 February 1964, NA: MAF 35/1018, 177b.

<sup>82</sup> Rudolph Peters, ‘Fluoroacetamide’, *New Scientist*, 12 February 1964, p. 410.

<sup>83</sup> *Ibid.*, p. 411.

<sup>84</sup> Report on the Examination of Relicta from Cow – “Melba” Belonging to Jull & Sons, Smarden, for Chlorinated Pesticide Residue’, [20 August 1963], NA: MAF 35/1017, 149.

<sup>85</sup> Mellanby, *Pesticides and Pollution*, pp. 148-54, makes a similar point.

<sup>86</sup> ‘Where Does All That DDT Insecticide Get To?’, *Kent & Sussex Courier*, 6 December 1963, p. 20; and ‘Careless Spraying “Scares” Expert’, *Kent & Sussex Courier*, 13 December 1963, p. 20.

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- <sup>87</sup> J.D. Caswell to The Private Secretary [Jean Arthur], 7 September 1963, NA: MAF 35/1017, 187; Norton, Rose, Botterill & Roche to S.J.B. Hurden, The Ministry of Housing and Local Government, 20 September 1963, NA: HLG 131/326; and F.D.T. Good, 'Pesticides and the Smarden Affair', *Mother Earth*, 13 (April 1964), 92.
- <sup>88</sup> *Toxic Chemicals in Agriculture. Report to the Minister of Agriculture and Fisheries of the Working Party on Precautionary Measures against the Chemicals used in Agriculture* (London: His Majesty's Stationery Office, 1951); *Toxic Chemicals in Agriculture: Residues in Food. Report to the Ministers of Agriculture and Fisheries, Health, and Food, and to the Secretary of State for Scotland* (London: Her Majesty's Stationery Office, 1953); *Review of the Persistent Organochlorine Pesticides: Report of the Advisory Committee on Poisonous Substances used in Agriculture and Food Storage* (London: Her Majesty's Stationery Office, 1964); and Solly Zuckerman, 'Opening Address' in Coleman-Cooke, *The Harvest that Kills*, pp. 11-16.
- <sup>89</sup> Mellanby, *Pesticides and Pollution*, p. 136. For the broader challenges of environmental epidemiology, see Devra Davis, *When Smoke Ran Like Water: Tales of Environmental Deception and the Battle Against Pollution* (Oxford: Perseus Press, 2002).
- <sup>90</sup> G.O. Lace, 'Poisoning of Animals in Merthyr Tydfil and Smarden Minute', NA MAF 35/1017, 185.
- <sup>91</sup> Ross and Amter, *The Polluters*, pp. 4, 34; and Devra L. Davis, Maryann Donovan, and Arlen Blum, 'Afterword', in Joyce Egginton, *The Poisoning of Michigan*, p. 334.
- <sup>92</sup> John Sheail, *Pesticides and Nature Conservation: The British Experience 1950-1975* (Oxford: Clarendon Press, 1985), pp. 58-84, 140-74; J.C. Taylor and D.K. Taylor, 'A Short Note on the Heavy Mortality in Foxes during the Winter 1959-60', *The Veterinary Record*, 73 (11 March 1961), 223-33; and Mellanby, *Pesticides and Pollution*, pp. 137-41.
- <sup>93</sup> Carson, *Silent Spring*, p. 25.
- <sup>94</sup> Frank Graham, Jr., *Since Silent Spring* (1970; rept. London: Pan/Ballantine, 1972), pp. 78-83.
- <sup>95</sup> Mellanby, *Pesticides and Pollution*, p. 137.
- <sup>96</sup> *Punch*, 6 March 1963, reprinted in Harrison, *Seeking a Role*, p. 134.
- <sup>97</sup> 'The Wrong Road', *Kent & Sussex Courier*, 24 January 1964, NA: MAF 35/1018.
- <sup>98</sup> Alastair G. Thomson, 'Murder Weapon', *The Guardian*, 3 October 1963, p. 8.
- <sup>99</sup> 'Doctor Who: The Classic Series', <http://www.bbc.co.uk/doctorwho/classic/> (accessed 7 March 2014). In addition, see the novelisation, published in 1990 but based on the original scripts: Terence Dicks, *Doctor Who: Planet of Giants* (London: Target, 1990).
- <sup>100</sup> See, for example, Gottlieb, *Forcing the Spring*.
- <sup>101</sup> C.H.M. Wilcox Minute, 11 December 1963, NA: MAF 35/1017: 'I gather that if it hadn't been for the prominence given to fluoroacetamide by Smarden it would probably never have occurred to anybody to make the test for this on the Merthyr Tydfil pony ...'.
- <sup>102</sup> 'Old Gert Dies for Science', *Daily Herald*, 20 December 1963, NA: MAF 35/1017
- <sup>103</sup> J. Hensley, 'Copy of Manuscript Minute. Weybridge Report on Smarden', 10 December 1963, NA: MAF 35/1017, 227.
- <sup>104</sup> 'Poison Hush-Hush', *Daily Herald*, 7 January 1964, NA: MAF 35/1017; 'Dogs Die in Poison Test', *Daily Mirror*, 6 January 1964, p. 5, NA: MAF 35/1017; 'Lorry Load of Dogs Die in Drug Test', *Sunday Telegraph*, 15 January 1964, NA: MAF 35/1017.

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<sup>105</sup> See Hansard, HC Deb, 3 February 1964, vol 688, cols. 820-26. In addition, see *The Guardian's* account of the debate in the House of Commons: Norman Shrapnel, 'Reassuring for All but the Fish', *The Guardian*, 4 February 1964, p. 1.

<sup>106</sup> BBC 10 O'Clock Programme (Home Service News), 2 October 1963 {typescript}, NA: MAF 35/1017.

<sup>107</sup> F.D.T. Good, 'Letters to the Editor: "Mystery" Poisoning of Animals', *The Veterinary Record*, 75 (30 November 1963), 1310; idem., 'Letters to the Editor. Toxicity of Organic Fluorine Compounds', *The Veterinary Record*, 76 (4 January 1964), 17-18; D.H. Phillips, 'Letters to the Editor. Toxicity of Organic Fluorine Compounds', *The Veterinary Record*, 76 (4 January 1964), 18; T.A.R. Chipperfield, 'Letters to the Editor: Toxic Chemicals', *The Veterinary Record*, 75 (14 December 1963), 1392; D.H. Phillips, 'Letters to the Editor: "Mystery" Poisoning of Animals', *The Veterinary Record*, 75 (14 December 1963), 1393; R.K. Sharratt, 'Letters to the Editor. Editorial Censorship', *The Veterinary Record*, 76 (4 January 1964), 19.

<sup>108</sup> F.D.T. Good, 'Letters to the Editor. Factory Farming', *The Veterinary Record*, 76 (20 June 1964), 708.

<sup>109</sup> Ruth Harrison, *Animal Machines* (London: Vincent Stuart Ltd, 1964).

<sup>110</sup> Ruth Harrison Advisory Group, *Farm Animal Welfare: Summary of Proposals* (London: Education Services and Ruth Harrison, [1965]). In addition, see R. Harrison, 'Case Study: Farm Animals', in R.J. Berry, ed., *Environmental Dilemmas: Ethics and Decisions* (London: Chapman & Hall, 1993), pp. 118-35.

<sup>111</sup> Deedes, , 'The Smarden Poisoning Episode Reminded Me Irresistibly of a Novel'.

<sup>112</sup> Deedes, *Dear Bill*, pp. 191-94.

<sup>113</sup> See, for example, Stanley Baker, 'Rat Poison Firm to Pay: Concern over Soil Disposal', *The Guardian*, 18 February 1964, p. 16.

<sup>114</sup> William Deedes to Christopher Soames, 18 September 1963, NA: HLG 131/326. In addition, see Deedes' earlier letter to Soames, dated 16 August 1963, NA: HLG 131/326: 'What bothers me about the case is not so much the poisoned animals but the fact that it is manifestly a case in which the various authorities concerned find it difficult to act decisively. In consequence, nobody acts'.

<sup>115</sup> Johnson, *The Politics of Environment*, , pp. 73-74.

<sup>116</sup> Peter Walker, *Staying Power: An Autobiography* (London: Bloomsbury, 1991), pp. 76-77; Kevin Jefferys, *Anthony Crosland: A New Biography* (London: Richard Cohen Books, 1999), pp. 142-45; Andy Beckett, *When the Lights Went Out: Britain in the Seventies* (London: Faber and Faber, 2009), pp. 33-46; and Johnson, *The Politics of Environment*, pp. 24, 133-79.

<sup>117</sup> Deedes, *Dear Bill*, pp. 193-94.

<sup>118</sup> Hansard, HC Deb. 19 March 1965, cols 1741-1742.

<sup>119</sup> 'Industrial Waste Inquiry', *The Guardian*, 26 February 1964, p.2.

<sup>120</sup> See Kenneth Mellanby, *Waste and Pollution: The Problem for Britain* (London: HarperCollins, 1992), pp. 55-56; and Veldamn, *Fantasy, the Bomb, and the Greening of Britain*, p.222.

<sup>121</sup> 'Village of Fear Smiles Again', *People* [London], 19 January 1964, NA: MAF 35/1018.

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<sup>122</sup> Kamal Ahmed, ‘Death from CJD Brings Cluster in Kent to Six’, *The Guardian*, 4 August 1997, p.4.