

# PESTICIDES, POLLUTION, AND THE UK'S SILENT SPRING, 1963-64: POISON IN THE GARDEN OF ENGLAND

by

J.F.M. Clark

*School of History, University of St Andrews, St Andrews KY16 9AL, UK*  
jfc2@st-andrews.ac.uk

Despite being characterized as ‘one of the worst agricultural accidents in Britain in the 1960s’, the ‘Swarden incident’ has never been subjected to a complete historical analysis. In 1963, a toxic waste spill in Kent coincided with the publication of the British edition of Rachel Carson’s *Silent Spring*. This essay argues that these events combined to ‘galvanize’ nascent toxic and environmental consciousness. A seemingly parochial toxic waste incident became part of a national phenomenon. The Swarden incident was considered to be indicative of the toxic hazards, which were borne of technocracy. It highlighted the inadequacies of existent concepts and practices for dealing with such hazards. As such, it was part of the fracturing of the consensus of progress: it made disagreements in expertise publicly visible. By the completion of the episode, ten different governmental ministries were involved. Douglas Good, a local veterinary surgeon, helped to effect the ‘reception’ of *Silent Spring* in the UK by telling the ‘Swarden story’ through local and national media and through the publications of anti-statist organizations.

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Long shadows fell over the village and over the people who lived there. There was, for one thing, the shadow of the ‘boffins’ who descended on the place, lifting samples of earth and departing in haste for London: there was the shadow cast by the bowler-hats of three different Ministries ... , hats belonging to important-looking men who would neither confirm nor deny the wild rumours that were everywhere.

There was, too the shadow of local officialdom – local councillors, doctors and veterinarians. And over all there was the shadow of death – present and probably potential.<sup>1</sup>

Recognized as one of the most significant contributions to Western literature and as one of the ‘books that changed America’, *Silent Spring* is acknowledged as the ‘effective beginning’ of ‘toxic discourse’, and as a pivotal contribution to emergent modern environmentalism.<sup>2</sup> The threat from radiation and chemicals lingered in the text of the

book. Drawing readers' attention to these twin toxic hazards, Rachel Carson effectively fused pre-existent pollution concerns of urban and industrial reformers to ecological sensitivities of resource conservation and wilderness preservation. Gary Kroll, who has examined the impact of *Silent Spring* on public understanding of science and the environment, makes a case for a contextualist study of the book.<sup>3</sup> Significantly, however, his analysis of 'reception' principally encompasses the role of media in mediating and shaping the dissemination of, and responses to, the book. Building on Hal Rothman's argument, Kroll asserts that the various manifestations of *Silent Spring* – serialization for *The New Yorker*, a book, and a television exposé – collectively constituted a 'galvanizing event', which alerted the public to urgent environmental issues, and transformed local concerns into a national consensus. Rather than restrict his gaze to an instrumentalist conception of the production of 'texts', Kroll examines the ways in which the different 'Silent Springs' resonated with specific constituencies.

Similarly, this essay argues that an ostensibly localised disaster became a 'galvanizing event' for environmental consciousness, once placed within the more universal context of Carson's *Silent Spring*. Responses to a toxic waste incident in Smarden, Kent (and Merthyr Tydfil, Wales) metamorphosed into a formative assessment of the use of pesticides in the British countryside. In October 1963, Archie MacPhee, the BBC Home Service News agricultural correspondent, predicted:

[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>4</sup>

Significantly, MacPhee referred to ‘The Silent Spring’ and, thereby conflated the book title with the ‘CBS Reports’ television episode entitled, ‘The *Silent Spring* of Rachel Carson’, which aired on 4 April 1963. This television exposé highlighted an aspect of the book which would resonate with critics of the Smarden incident. By extending ecology beyond the restricted domain of traditional science, ‘The Silent Spring’ mounted an attack against Western scientific progress. In its various manifestations, *Silent Spring* was a fable of legitimacy: technocracy, underpinned by a consensus of science-based progress, confronted a contested plurality of expertise.<sup>5</sup>

Smarden’s silent spring was, therefore, symptomatic of a ‘sea-change’ which beset science in the long 1960s. Jon Agar contends that this period witnessed the emergence of publicly visible, divergent views of experts.<sup>6</sup> He posits three overlapping phenomena. First, scientists were driven to make public displays of disagreement. Second, emergent social movements provided fertile soil for the burgeoning demand for experts, and for the increasingly visible disagreements among them. And, finally, introspective examinations of the self elicited a challenge to faith in technocracy: the politics of personalism supplanted scientific expertise in aid of governance. Scientists, as activists, played a vital role in this process. Rachel Carson, for example, was a biologist, with considerable experience of working at the Fish and Wildlife Service, when she highlighted the contested nature of DDT. Expert knowledge about the baneful effects of this organic insecticide stretched back to 1945,<sup>7</sup> but not until the 1960s were numerous divergent views sufficiently accessible so that they could be coordinated by the likes of Carson as a publicly visible debate. Journalists played an important role in this process – as communicators, as proxy experts, and as active critics of science.

This essay examines the ‘long shadows that fell over the village’ of Smarden. More particularly, it provides an anatomy of ‘one of the worst agricultural accidents in Britain in the 1960s’.<sup>8</sup> It does so by investigating the relationships between environment and technocracy, within the context of contested expertise. The Smarden incident arose out of changes to the countryside in post-Second World War Britain. Critics of the central government’s handling of the incident subsumed it within a broader lament against the rise of ubiquitous synthetic chemicals: it was part of the emergence of ‘toxic consciousness’. Through an exploration of the initial governmental response to the incident, this essay assesses the limitations of existent pollution legislation in the 1960s. But it also notes the different ways in which central government (hereafter Government) scientists, independent experts, and media framed the incident. These tensions – and their resonances for readers of Carson – ran through key facets of the incident. Contemporaries identified a local pollution episode as fundamentally important to broader arguments about the threats that pesticides posed to the environment, including human and animal health. Furthermore, as a fluorine compound, the offending toxic contaminant intersected with contentious debates about the fluoridation of water, which were often articulated within the rubric of ‘popular’ ecology. Finally, the essay assesses the institutions, broadly construed, through which concerns were articulated, and upon which the Smarden incident cast a long and lingering shadow.

#### SETTING THE SCENE

Between late December 1962 and 23 July 1963, a pesticide firm, Mi-Dox Agricultural Division of Rentokil Laboratories, engaged in the manufacture of a toxic chemical. As a result of this industrial activity, fluoroacetamide was released into the environment, and

produced the first documented ‘outbreak’ of poisoning of farm livestock in Britain. Recounting the incident in early 1964, local veterinary surgeon, Douglas Good, began his tale a year earlier, in January 1963, when a worker from the Rentokil factory presented him with two Labrador puppies, which had died from ingestion of a suspected, but unknown, poison. In mid-May, G.H. Lowe called Good to Great Omenden Farm, which was adjacent to the same factory, after seven of his sheep had died suddenly. The following day, Good attended Limes Land Farm, directly across the road from the factory, to examine a goat, which showed symptoms of poisoning before dying several hours later. Suspecting that the factory had contaminated ditches and ponds with toxic chemicals, Good immediately contacted the Kent River Board, which had statutory responsibilities for the control of pollution of streams.<sup>9</sup>

Several days earlier, on 12 May, another local veterinary surgeon, J.S.L. Jones, had been called to Roberts Farm, owned by William Jull and his sons, Cyril and Norman, which was also adjacent to the factory. Amid a ‘high yielding and well-managed herd’ of 26 Friesians, a cow had unaccountably collapsed. Although it survived in a distressed state, three other cows died suddenly in mid-May. After the deaths of several more cattle over the following months, Jones and Good called in the Veterinary Investigation Officer from Wye, Kent, who, in turn, requested the services of the Biochemistry Department of the Central Veterinary Laboratory on 16 July 1963. At this point, scientists affiliated with the Ministry of Agriculture, Food, and Fisheries (MAFF) became involved in the incident.<sup>10</sup>

The West Ashford Rural District Council (hereafter the Council) became aware of the incident when Judge J.D. Casswell contacted them on 28 June. Casswell wrote on

behalf of his son, who owned Limes Land Farm, where a number of domesticated animals had died. The Council informed both the Kent River Board, which had already made an initial inspection, and the Alkali Acts Inspectorate. By late July, the local newspaper press was alerted to the 'Smarden factory health menace' after the matter was discussed at a Council meeting.<sup>11</sup>

Significantly, the exact nature of the fatal poison remained a 'mystery' throughout this period. On his first visit to Limes Land Farm in May, Good had been told by a former employee of the factory that fluoroacetamide was being manufactured there. The Kent River Board claimed that they had not received this information before they made their initial inspection of the affected water, and, therefore, did not test for the presence of the chemical. 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>12</sup> That said, the manager, B.W.J. Wulff, was not entirely forthcoming about possible chemical wastes. Responding to enquiries from Good on 18 and 23 July, Wulff declared:

We are not discharging any chemical effluent to ditches on our property but are carting all effluents away or evaporating them to dryness .... I consider it impossible that even in cases of gross negligence or carelessness any chemical effluent could be discharged from here other than Sulphuric Acid of the neutralised acid which would be mainly Sodium Sulphate with small quantities of Sodium Bromide or Potassium Fluoride, Potassium Chloride residue.<sup>13</sup>

When Ministry of Agriculture scientists visited the factory on 29 July, they quickly came to a different conclusion. They discovered that the factory had only recently begun to cart its waste to a quarry in Essex. Prior to this, there was clear evidence that the land at the back of the factory had been used as a general dumping ground, with large, rusting metal drums and canisters and a black sludge in close proximity to ditches which

communicated with ponds and streams in neighbouring properties. A relative of Jull's wife, who worked at the factory as a clerk, asserted that her employers had started to manufacture fluoroacetamide in late December 1962. In his confidential internal report, MAFF 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>14</sup>

By early August, therefore, there was strong circumstantial evidence that the animal deaths were caused by fluoroacetamide poisoning. Moreover, the inspection team acquired water samples, from the affected ditches and ponds, and tissue samples, from two slaughtered cows on the Julls' farm, in order to make a more definitive diagnosis. Interestingly, Good later recounted that the de la Warr Laboratories, from Oxford, had assisted him in July, when they brought sophisticated equipment to Roberts Farm. Within 'minutes', he declared, they had identified the presence of fluoroacetates. This was never mentioned in the copious notes of the various Governmental ministries. Instead, they waited until the end of November for the results of investigations on their collected samples.

In late September, however, national fear about fluoroacetamide poisoning grew significantly when 75-100 dogs and cats were accidentally poisoned by the same chemical at Merthyr Tydfil, Glamorgan, Wales. Much to the dismay of Government scientists, Smarden and Merthyr Tydfil became linked as part of a popular indictment of the dangers of fluoroacetamide. Concerned by the apparent environmental persistence of fluoroacetamide, MAFF placed two experimental cows on the Julls' affected land on 7

October.<sup>15</sup> The cows were left to graze, but were denied access to the ditches and ponds. Despite the latter restriction, one cow died in late December, and the second succumbed to poisoning one month later. By this time, the press had caught wind of a possible case of human poisoning arising from the Smarden factory. Harold Farris, one of their employees, was referred to the National Poisons Information Centre at Guy's Hospital for testing.

With the death of animals and a possible human victim, the Government now acted decisively. Fluoroacetamide was banned as an insecticide on 7 February 1964, and the Government declared that polluted soil from the factory site would be removed and dumped at sea. In addition, in late February, the leader of the Labour Party, Harold Wilson, announced the creation of an industrial waste inquiry, in explicit response to Smarden.<sup>16</sup> The following month, soil packed with cement in oil drums was removed from the factory at Smarden, and transported to the Bay of Biscay, where it was dumped into the sea. Despite this action, MAFF did not permit the Julls to resume full operations on their farm until March 1965, when Government scientists no longer found evidence of fluoroacetamide.<sup>17</sup>

Between the moment when Good was presented with the poisoned dogs in January and the time when his suspicions about the factory arose in May, a British edition of Rachel Carson's *Silent Spring* was published in February 1963. In his *Politics of Environment*, Stanley Johnson contended that 1963 was a watershed year for 'environmental' consciousness.<sup>18</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 Kent became evidence for a nationally significant indictment of pesticides in the English landscape.

*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>19</sup> The CBS Reports ‘Silent Spring’ episode accentuated Carson as a wise storyteller who faced opposition from laboratory-bound scientists. Drawing on the tone and style of Carson’s ‘fable’, the television exposé underscored a struggle between non-science and science as a direct parallel with a delicate environment beset by an unfeeling, arrogant science.<sup>20</sup>

Similar ambiguities arose from, and were fostered by, Good throughout the Smarden incident. On the one hand, as a veterinary scientist, he was uniquely placed to appreciate the implications of the Smarden incident. He had practised in South Africa,

from 1948-1952, with D.G. Steyn, with whom he remained in contact. Steyn was a leading expert on plants which converted inorganic fluorine compounds into highly toxic organic fluoroacetates. Furthermore, Steyn subsequently served as Chief Research Officer of the Life Science Division of the Atomic Energy Board of the Republic of South Africa. Expertise on fluoroacetates and nuclear science became important for the contested knowledge surrounding fluoroacetamide contamination in Smarden and Merthyr Tydfil. In fact, by February 1964, Good was convinced that fluoroacetamide might, itself, contain radioactive properties that were, at present, undetectable. He, therefore, called for 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>21</sup> Moreover, Good had also practised in Bedford, near the London Brick Company. The latter produced large quantities of sodium fluoride emissions, which resulted in chronic fluorine poisoning in sheep and cattle on surrounding grazing land.<sup>22</sup> Good had expert knowledge and experience of the toxic properties of fluorine compounds.

On the other hand, as an environmental advocate who exhorted toxic consciousness, Good assumed the role of a storyteller. 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, 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>23</sup>

Good publicly acknowledged the inspiration he took from *Silent Spring*, and the assistance that he received from Rachel Carson. Privately, he also noted that he

appreciated another book, which had appeared as an English edition in 1963 - former Nazi Guenther Schwab's apocalyptic environmental tale, *Dance with the Devil*. After sending his self-described 'short story' to renowned biochemist, Sir Rudolph Peters, Good explained: 'It was never intended as being a scientific documentation of events, but rather a story for the lay reader' – a fable of today.<sup>24</sup>

In keeping with his exemplars, Good provided evidence of an idyllic paradise besmirched by an evil spell. Roy Ingleton observes that the very idea of disasters seems incongruous with a county that regards itself as 'the Garden of England'. Perhaps for this reason, the parish of Smarden, which encompasses about thirty square miles in the Weald of Kent in southeast England, was an especially powerful and poignant confirmation of Carson's 'fable'.<sup>25</sup> The Rentokil factory, from where the toxic pesticides emanated in 1963, sat in the middle of agricultural fields about one mile from the historic, quintessentially English village of Smarden.<sup>26</sup> As if to reinforce the transnational character of Carson's tale, Smarden's celebrated historical architecture had acted as inspiration for many of the buildings in the restored village of Williamsburg, Virginia in the USA.<sup>27</sup>

In Britain, war-time necessity had made the nation 'a pacesetter worldwide in intensive agriculture'; and post-war reconstruction entailed a continued intensification of agricultural production that accelerated in the years following 1960. Farming metamorphosed into 'agri-business' as holdings increased; specialization and mechanization flourished as the mixed farm went into sharp decline. As agriculture became more 'industrialized', cheap nitrogenous fertilizers were applied to enhance soil fertility, and synthetic chemicals were deployed against various pests.<sup>28</sup> Across the UK

between the 1930s and 1970s, cereal production increased by threefold, and the populations of pigs and poultry doubled. Throughout the same period, the number of employees on farms fell, until by the 1960s, British farming per-capita output exceeded all other Western European countries, with the exception of Holland. Whereas their numbers declined, farms increased in size amidst a reduction in agricultural labour.<sup>29</sup>

Responding to these trends, Smarden witnessed a decline in the number of farms. Whereas there were about 60 farms in the parish of Smarden in 1881, numbers had fallen to 32 by 1950.<sup>30</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>31</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 repackage pesticide for sale and distribution, but in 1962, the company obtained planning consent for a factory extension, and began to manufacture methyl bromide and fluoroacetamide.<sup>32</sup> The latter chemical was sold as an insecticide and a rodenticide.

Contemporaries considered the Smarden incident to be evidence of the unwelcome elision of country and city.<sup>33</sup> They repeatedly remarked on the factory's alien presence in the rural countryside. M. Pym, a member of the West Ashford Rural District 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>34</sup>

Similarly, Major A.J. Palmer, another councillor, asserted that the factory ‘was not a suitable industry for this country locality ...’.<sup>35</sup> M.P. John Farr opined: ‘I feel that it is not too much to expect manufacturers of insecticides, pesticides and fungicides not to put their factories in the centre of some of the most fertile counties, as has been done and is still being done’.<sup>36</sup> Similarly, Bill Deedes, Smarden’s M.P. and Conservative Minister without Portfolio, observed that a ‘less suitable place for handling traffic in toxic chemicals would be hard to imagine’ because it was ‘slap in the middle of a farming area’.<sup>37</sup>

The response to the Smarden incident 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* (1955), 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>38</sup> Throughout the first half of the twentieth century, the ideal of England as a ‘green and pleasant land’ had been forged through a modernist commitment to preservation as realized through legislative planning. By the 1950s and 1960s, this mix of modernism and conservationism 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>39</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>40</sup>

#### PESTICIDE POLLUTANTS: ‘SWORDS INTO PLOUGHSHARES’

Confusion over the precise identity of the offending pollutant was symptomatic of the relatively recent spread of chemicals throughout the environment, and of the limited knowledge of their nature and impact. The two world wars of the twentieth century fostered a massive increase in the chemical industry, with pesticides being a significant component of this expansion. The science, technology, institutions, and language of chemical warfare were redirected to agricultural pest control during peacetime. Although natural inorganic poisonous pesticides had ancient roots, the mass application of synthetic organic pesticides was a twentieth-century phenomenon, often borne of military priorities and research.<sup>41</sup>

Whereas DDT was originally developed as an insecticide, fluoroacetamide had more nefarious origins. Paul Müller identified the insecticidal properties of DDT just prior to the outbreak of hostilities in 1939, so 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.

Moreover, the apparent ‘miraculous’ efficacy of DDT encouraged the release of further pesticides. But fluoroacetamide, like many other synthetic organic pesticides, arose from the search for a lethal chemical warfare agent. Polish scientists, who had been

synthesizing fluorine compounds as potential weapons, fled to England, where they informed British intelligence of their activities. Together with the Polish scientists, a group of chemists at Cambridge worked with the Chemical Research Department in London, Sutton Oak, and Porton to synthesize ‘highly toxic fluorine compounds’, known collectively as ‘fluoroacetates’, throughout the Second World War. After the war, they published their research on the properties and physiological action of the chemicals.<sup>42</sup> Fluoroacetamide ( $\text{FCH}_2\text{CONH}_2$ , known as 1081) had properties similar to sodium monofluoroacetate ( $\text{NaMFA}$ , or 1080), which had been used as a moth-proofing agent and a rodenticide. Because 1081 was thought to be relatively safer for humans than 1080, it became a popular rodenticide.<sup>43</sup> In the UK, it was sold as a rat poison under the trade names ‘Fluorokil “100 Per Cent”’ and ‘Fluorkil 3’. In the late 1950s, UK farmers also adopted fluoroacetamide as an insecticide to protect broad beans, brassicas, strawberries, and sugar beet. 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.<sup>44</sup>

As Rachel Carson pointed out, the synthetic insecticide industry was ‘a child of the Second World War’.<sup>45</sup> The total US production of DDT rose from approximately 10 million pounds, at the time of its introduction, 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 numerous new pesticides.<sup>46</sup> If not specifically DDT, Britain embraced pesticides with equal abandon: within three decades of the war’s end, over 90 percent of cereals,

vegetables, fruit trees, and bushes were being treated with pesticides.<sup>47</sup> Fluoroacetamide was subsumed within the broader discussion of pesticides. 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 and Oxford scientist. Peters had engaged in research on chemical warfare agents during both world wars. Most recently, he had produced important research on the ways in which toxic fluorine compounds were metabolized.<sup>48</sup> 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>49</sup>

By the time that *New Scientist* contacted Peters, he was already actively involved with investigations surrounding the events at Smarden.

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>50</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 populace.<sup>51</sup> Pesticides, he asserted, were essential tools for the rational management of the human population. But, as John Perkins has so ably demonstrated, mass application of pesticides arose out of a realignment of agriculture - from labour- to capital-intensive practices - rather than from an inability to feed people.<sup>52</sup>

The Smarden incident forced people to confront the extent and propriety of the use of chemical pesticides in Britain. When the MAFF Infestation Control Laboratory analysed one of the Julks' 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 Heptachlor epoxide.<sup>53</sup> As a civil servant complained in another context, improved techniques permitted detection of miniscule – and perhaps insignificant – quantities of insecticides. Nevertheless, findings like those for the Julks' cows demonstrated the pervasiveness of organic pesticides in the 'Garden of England' by 1963.<sup>54</sup> Addressing an audience in Maidstone, B.D. Moreton, a MAFF entomologist, estimated that 1,000 tons of DDT had been used in Kent since its introduction about fifteen years earlier.<sup>55</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 asserted 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>56</sup> In the case of fluoroacetamide, Britain stole a march on the US in the dissemination of a deadly weapon of war as a pesticide.

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 MAFF 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>57</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>58</sup> Humans, for example, can excrete sodium fluoroacetate whereas dogs cannot. Consequently, this particular chemical is far more toxic to dogs than humans.<sup>59</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>60</sup> Problematically, therefore, chemical hazards were no longer contained by clearly circumscribed laboratories: society became the new laboratory. The ineffable

nature of laboratory-bound ‘mysteries’ of expertise was, therefore, subjected to public scrutiny, and in the process opened itself to contestation.<sup>61</sup> Ulrich Beck contends that this kind of greater transparency called attention to the undemocratic underpinnings of the expertise which lay behind technocracy: unelected scientists were making potentially earth-altering decisions. Increasingly, the long-held belief in science as rational, disinterested knowledge, in aid of statecraft, faced searching criticism.<sup>62</sup>

The possible shortcomings of a technocratic, laissez-faire approach to the mass application of pesticides became obvious in Britain between 1956 and 1961. A significant number and variety of birds were found dead. These were principally seed-eating birds, such as 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>63</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>64</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>65</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>66</sup> Rachel Carson, by placing her critical examination of the pervasiveness of toxic chemicals within an ecological narrative, 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>67</sup>

Perhaps unsurprisingly, when the industrial waste spill at Smarden came to light in 1963, it was located in a Carson-inspired 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>68</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>69</sup>

In 1963-64, the events at Smarden and Merthyr Tydfil were subsumed within an 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, the military, and

capitalism. Moreover, the ecological implications of pervasive pesticides underscored the deficiencies of existent, technocratic-inspired reductionist pollution legislation.

#### SMARDEN AND THE LIMITS OF POLLUTION LEGISLATION

The twentieth century witnessed a vast proliferation of synthetic chemicals; and, as Smarden demonstrated, these infiltrated air, water, and land. As various ministries of the Government sought to define and contain the incident at Smarden, they noted the potential shortcomings of environmental legislation, which had arisen out of the nineteenth-century ‘revolution in government’ – the expansion of public administration, underpinned by scientific expertise. Could nineteenth-century legislation address the ecological complexities of the twentieth-century chemical revolution? Lowe, of Great Omenden Farm, who struggled to place the events of Smarden within his vision of Britain, bemoaned the inadequacy of existent legislation. 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>70</sup> Smarden foregrounded the limitations of the ‘politics of pollution’ in the late twentieth century. In the absence of a distinct ministry of the environment, there was a notable lack of clearly defined institutions and experts to conduct public discussion of the crisis which beset Smarden. By the conclusion of the episode, ten different central governmental ministries, all with competing interests and experts, were involved.

In his examination of the ‘politics of pollution’, Albert Weale discerns a common pattern of progression. First, building on existing policies and structures of pollution control, legislation addresses air and surface water. Legislative priorities subsequently

shift to chemical pollutants; and then, finally, encompass waste disposal.<sup>71</sup> The Governmental response to the Smarden incident followed this trajectory.

Through the drift of noxious fumes and Rentokil's misdirection, the spectre of methyl bromide meant that the Smarden incident 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 taken against the 'Smarden "smell"', which one member of the Council proclaimed 'was perfectly shocking'.<sup>72</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>73</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 Casswell more aware of the legalities of air pollution. The word 'nuisance' carried meaning in common law. Moreover, Casswell concluded his letter by noting that the Rentokil factory did not have the required licence under the Alkali Acts. In Britain, public interest in pollution was served by a combination of nuisance law and administrative procedures stretching back to the nineteenth century.<sup>74</sup>

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 incident, on 10 September 1963, Keith Joseph, Minister of Housing and Local

Government, 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>75</sup> Joseph consistently characterized the Smarden incident as a one-off that could not have been foreseen.<sup>76</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.

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>77</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>78</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>79</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>80</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 company denied that they had ever dumped, on their premises, any waste which had arisen from the manufacture of fluoroacetamide; and they claimed no 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 Council to deny Rentokil planning permission to manufacture methyl bromide.<sup>81</sup> Although they ultimately acted against fluoroacetamide, the Council followed the suggested course of action.<sup>82</sup> They did so in the face of opposition from Rentokil, who contended that, unlike methyl bromide, the manufacture of fluoroacetamide was covered within their earlier planning permission for ‘light industrial’ use. Ministry of Housing and Local Government officials had privately speculated that Rentokil might have had a case. After all, they reasoned, the

production of fluoroacetamide produced no noise or smell.<sup>83</sup> Considerations of toxicity, therefore, were not clearly articulated within the planning legislation which the Government contended was the best means for addressing this pollution incident. In the event, Rentokil elected not to contest the Council's 'discontinuance order' for fear of further adverse publicity. This did not, however, alleviate public concerns. Despite the Government's best efforts to contain this incident as a deviation from planned management, the events at Smarden elicited broader questions about the health of the countryside and of humans.

#### THE PUBLIC HEALTH THREAT AT SMARDEN

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>84</sup> Murray Bookchin's *Our synthetic environment* (1962) placed one facet of this epidemiological transition in the post-Second World War context. Bookchin argued that concerns for infectious diseases had been replaced by public health problems which had arisen from environmental pollution.<sup>85</sup> For people in Britain, the events at Smarden reinforced the possible human health risks arising from the use of toxic pesticides.

From a very early stage in their investigations, the Government maintained that there was no threat to human health.<sup>86</sup> In September 1963, Deedes informed his fellow cabinet ministers that locals accepted this point; but this was a misreading of the situation.<sup>87</sup> Although Government officials and scientists privately dismissed any risk to human health, they were reluctant to provide such assurances to locals. The latter,

therefore, consistently highlighted the possible threat to humans. In August, for example, Lowe's solicitors warned the Government, the Council, and the National Farmers' Union that 'there is a danger of human as well as animal deaths in addition to animal deaths which have already occurred'.<sup>88</sup> At the same time, ten persons, representing five households, presented a petition to the Council, which expressed concern for the health of animals and humans.<sup>89</sup> Writing to the Council in early September, Good 'included human life as well as animal life being in danger'.<sup>90</sup>

As events unfolded in August and September 1963, the tensions between Government advice and local experiences of the continuing incident became more pronounced. Additional 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 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>91</sup> But Elliott was clearly confused about the implicated poison. In a three-way exchange between Elliott, J.L. Griggs, and Good in September, it became evident that Elliott was offering advice on safe levels of exposure to an inorganic fluorine compound, such as sodium fluoride, when, in fact, fluoroacetamide was a far more toxic organic compound. Good explained the distinction to Griggs, but Elliott continued to contest the veterinarian's distinction.<sup>92</sup> In an earlier internal Ministry of Health memorandum, Elliott had been dismissive of Good's evidence and claims:

When I saw Mr Griggs the Clerk of the R.D.C. he told me that he had a letter from a Vet. Mr. Goode [sic] who was acting on behalf of one of the farmers who had lost stock. He said he had samples of the water analysed by the County Analyst who found 0.4, 0.6 and 23 p.p.m. of fluoride. Mr Goode went on to say that water containing 0.1 p.p.m. (repeat 0.1 p.p.m.) would be toxic to animals. I assured Mr. Griggs that this was not so and that no harm would come to cattle if

they drank water containing 23 p.p.m. for several weeks, nor would the milk yield be affected. I said I would consider it safe for milk to be sold for consumption if it contained 5 p.p.m. of fluoride though not of course as a normal procedure.<sup>93</sup>

One week after Elliott's visit, four more cattle, from the Julles' farm, had to be slaughtered at a knacker's yard.<sup>94</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 J. Marshall, the local Medical Officer of Health, immediately stopped the sale of any further milk from the Julles' herd, and telephoned Elliott to inform him of his actions. By the end of September, the 11 remaining cows from the initial herd of 26 had to be destroyed: the carcasses were burned on the 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 Julles don protective gear and bury the ashes to a depth greater than six feet. He concluded his internal report to 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>95</sup>

Another fluoroacetamide incident in Merthyr Tydfil in the same month, compounded public concerns. Moreover, because it involved the death of domestic pets, 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 contaminated pony, which was rendered into pet food following its death.<sup>96</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>97</sup> Barnes emphasized the variability of toxicity among different species of animals. 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 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’. Explications of chain poisoning had been among the most powerful examples which Carson employed to educate the public on the ecological threats of pesticides.<sup>98</sup> Once again, however, 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>99</sup>

Privately, Government scientists bemoaned the fact that the news media were linking the two incidents because they had entirely different origins. The Merthyr Tydfil episode likely arose from the local authority’s use of fluoroacetamide as a rodenticide at a local dump, where the pony fatally ingested it. Although the local authority claimed to only use warfarin as a rodenticide, Rentokil quickly confirmed that they had recently sold them a large consignment of fluoroacetamide. For Good, Phillips, and some of their veterinary colleagues, the two incidents were evidence of the dangers arising from the use

of toxic chemicals, irrespective of the means by which they contaminated the environment.

When Harold Farris, an employee of the Rentokil factory in Smarden suffered a mystery illness in January 1964, fears of human toxicity grew.<sup>100</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. After he declared that he was ‘very worried’, he was sent to the National Poisons Information Centre at Guy’s Hospital, London for testing, despite Rentokil’s scepticism. 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 informed a local journalist that he ‘had seen a medical report on Farris, which stated he was suffering from “bronchial pneumonia and fluoroacetamide poisoning”’.<sup>101</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.<sup>102</sup> Lack of an expert consensus about possible threats to human health stoked fears at Smarden. These, in turn, were subsumed within a broader debate about the fluoridation of drinking water.

#### PESTICIDES, FLUORIDATION OF WATER, AND POPULAR ECOLOGY

Policy, expertise, and public health tensions and concerns regarding fluoroacetamide as a pesticide were compounded by post-Second World War disputes surrounding the science

of water fluoridation. These associations have endured. As late as July 2003, a publication opposed the fluoridation of drinking water, with the erroneous assertion that ‘fluoride is the active ingredient in most insecticides ...’.<sup>103</sup> 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 sodium 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>104</sup> Similar themes informed the critical response to Smarden’s fluoride pollution incident. Although Good understood the different toxic properties of sodium fluoride and fluoroacetamide, he placed the Smarden incident in the context of anti-fluoridationist discussions

Chris Sellers’ analysis of American anti-fluoridation disputes captures the public divergence of expertise, and the interconnections between concern for fluoridation of drinking water and the mass application of pesticides. 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>105</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>106</sup> In the US, the officially recognized tolerance level for fluoride – 7 ppm – was used as the administrative tolerance for DDT in 1945.<sup>107</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>108</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>109</sup> Writing in *The Guardian* in December 1963, 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>110</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 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’.<sup>111</sup> 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>112</sup>

Explicitly responding to recent publicity surrounding Smarden and *Silent Spring*, this particular article drew direct comparisons between the anti-insomnia and anti-nausea drug thalidomide and the application of pesticides, such as fluoroacetamide 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>113</sup>

By noting the close relationship between pesticides and chemical warfare, Carson had cast these substances in the role of weapons of war and mass destruction.<sup>114</sup> She alerted the public to an invisible pollutant that could travel great distance, accumulate in body fats, and cause cancer, birth defects, and mutations. Explicitly pairing chemical insecticides with radiation, Carson wrote in the shadow of the apocalyptic mushroom clouds over Hiroshima and Nagasaki.<sup>115</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>116</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>117</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 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>118</sup> Like nuclear fallout, the pervasiveness of chemicals was an all-encompassing threat to the environment, including its human and animal occupants.

#### SCIENCE, PROFESSION, AND ANIMAL WELFARE

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>119</sup> The case of Smarden underlines the importance of another significant factor for the emergence of environmental consciousness in Britain: animal welfare. Smarden did not garner considerable national attention until Good helped to expose a link with the poisoning of dogs and cats at Merthyr Tydfil.<sup>120</sup> Tellingly, in February 1964, M.P. John Farr summarized the salient issues surrounding the fluoroacetamide incidents by erroneously recalling that Merthyr Tydfil pre-dated events at Smarden.<sup>121</sup>

The death of two test cows that the Government had placed on the contaminated land produced a flurry of media interest in December 1963 and January 1964. 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>122</sup> As Ministry of Agriculture officials had predicted, however, it was not the story of Gert and Daisy that fuelled most of the public outcry. Rather, it was the outrage of ‘dog lovers’.<sup>123</sup> To confirm fluoracetamide 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>124</sup> Indignant observers connected the senseless loss of animal life with a critique of industrial agribusiness, and forced the Government to act. Fluoroacetamide was banned as an agricultural and gardening insecticide, and 2,000 tons of contaminated soil were 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>125</sup>

By December 1963, Douglas Good publicly acknowledged the key role that he and his profession had played in the Smarden incident. ‘Veterinary surgeons’, he declared, ‘have never ceased to hammer away at demanding that the public should be given more information about this poison’.<sup>126</sup> Flow of information and concomitant trust in expertise constituted the most prominent nexus of tension surrounding this toxic episode. As awareness of the contamination dawned in July 1963, Lowe wrote to Good, and demanded a ‘conclusive’ report, in the wake of ‘rumours’, so that he could proceed with agricultural work on his farm. ‘I am certain that’, he noted, ‘if there would be the slightest danger for human or animal life or contamination of crop, you and naturally the authorities concerned would point out such danger to me and indeed the other neighbouring farmers’.<sup>127</sup> As Government scientists privately accepted, local veterinarians relied upon their regional Veterinary Investigation Centres to provide them with relevant investigative results in such situations. But fearing impending litigation against the Rentokil factory, the Government prevaricated. Despite initial reports in early and late August, the Government delayed disclosure of their evidence. Admittedly, at this point, much of it was circumstantial. In September 1963, they released a brief summary of their report to the Council, but elected not to provide similar details to Good or to the solicitors for the Julls and for Lowe, who had been in contact. Good wrote to Sir John Ritchie, Chief Veterinary Officer, requesting results from the Government investigation of late July: ‘If no report will be made available to me, would you please let me know, so that I may make other private arrangements in order to be able to advise my clients...’.<sup>128</sup>

Soames informed Deedes that discretion was required, in light of possible litigation; and that this was a matter best left to the Ministry of Housing and Local Government, which had been passed the relevant details. Deedes, who had also been in contact with Good, identified the dangers of Government inaction: ‘it is just the kind of story which if it gets into the Press can create an impression of bureaucratic inefficiency and failure to take warnings from people like this vet and although the case arises in my own constituency it could, if it went wrong, have much wider repercussions’.<sup>129</sup>

Deedes’ warning proved prescient. After scientists completed their more definitive biochemical analysis in late November 1963, the Government again delayed release of the results. When they had done this in September, events overtook them, and suspicions grew and spread, in the wake of the Merthyr Tydfil poisonings. Similarly, the delay several months later was soon compounded by the death of the test cows, and of the diagnostic dogs. The *Daily Herald*’s report was typical of the press response:

Once again a report of public importance is being hushed up by a Government Department .... The ministry insist that it must be kept secret. Why? If there are still dangers the public should be warned.<sup>130</sup>

By the end of January 1964, the Council was sufficiently concerned to demand a meeting with ministry officials. Major A.J. Palmer, a former Council chairman, declared, ‘it will not be until a few people die that anything will be done’. Veronica Wood, who chaired the resultant meeting in Ashford in February, closed proceedings with a statement that she and her fellow councillors ‘had been disturbed that they had not been allowed to see the confidential reports’; and she demanded more cooperation and information from the Government in the future. Alert to the dissatisfaction of the local government, Deedes subsequently informed the Council that he had arranged for the War Office Chemical

Warfare Department at Porton ‘to come in and lend a hand’. He asked that this information not be made public because it would, inevitably, ‘create undue excitement’. Deedes’ attempt to allay the councillors’ anxieties was, perhaps unsurprisingly, unsuccessful. At the next Council meeting, it was reported that rumours had been circulating that drivers of the lorries, engaged in removal of contaminated soil at Smarden, had been ‘taken ill’.<sup>131</sup>

Between October 1963 and January 1964, Good attempted to rouse support from the veterinary profession for his campaign against fluoroacetamide and other toxic chemicals. Once again, he met with resistance. The editor of the *Veterinary Record*, the official publication of the British Veterinary Association, refused to publish a number of Good’s letters for fear of litigation. In fact, for some time, the editor refused to publish the word ‘fluoroacetamide’ because he worried that it might be a proprietorial name. Through the correspondence pages, Good and five other colleagues railed against professional negligence and Government bureaucracy. In December 1963, T.A.R. Chipperfield advised his colleagues to look to other literature in the absence of information from the *Veterinary Record*:

‘Silent Spring’ brings the entire problem into focus – it is not parochial, nor even national – it is international; for this is not merely a problem with sentimental or emotional facets deriving from the ill-effects produced on wild-life; it affects the personal health, Sir, of you and me and our children and grandchildren.<sup>132</sup>

Significantly, Good, Chipperfield, and other fellow-travellers confronted the dangers to animal and human health. Anne Hardy has highlighted the tensions between veterinarians’ professional aspirations, and the resistance to a unified pursuit of human and animal health throughout the early twentieth century.<sup>133</sup> Moreover, Good and his colleagues expressed dissatisfaction with Government scientists. Phillips asserted:

The only ‘mystery’ there is over this poisoning has been the behaviour of should-be interested bodies.... The Ministries of Health, Housing and Local Government, and Agriculture, due to the peculiar code under which they operate and co-operate, found themselves unable to take any positive or directly helpful interest.<sup>134</sup>

An ‘evil spell’ had truly fallen on the Garden of England, as the competing expertise of local and central government and academic scientists, medical doctors, and veterinary surgeons became publicly visible.

Perhaps unsurprisingly, in June 1964, Good returned to the fray. He implored members of his profession not to be afraid of ‘big brother’, and to take greater heed of a recently published book, Ruth Harrison’s *Animal Machines* (1964).<sup>135</sup> Including a foreward by Rachel Carson, *Animal Machines* offered a damning exposé of factory farming, and generated intense media interest.<sup>136</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>137</sup>

## CONCLUSION

In March 1965, when the Ministry of Agriculture seemed about to grant the Julles permission to resume ‘normal cultivations’, Deedes took the opportunity to reflect upon the lessons of the Smarden incident.<sup>138</sup> After reviewing the subject at hand, 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>139</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>140</sup> In September 1963, Deedes wrote to Soames:

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 ... 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>141</sup>

As 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'. Moreover, '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>142</sup> This was a cumulative process to which Smarden contributed. Through accident of circumstance, however, Smarden was in the Ashford constituency of Deedes, Minister without Portfolio. Deedes 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>143</sup>

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 the Guinness corporation:<sup>144</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>145</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. 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>146</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>147</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 Carson-inspired ecological critique of pesticides.

MacPhee had been misguided in according the fluoroacetamide poisonings of 1963 pre-eminence over *Silent Spring*. The Smarden incident was a 'galvanizing event' for the UK precisely because it provided a local 'reception' for Carson's universal tale. Ostensibly, this tale addressed the 'evil spell' cast by a global pall of poison, but it was, fundamentally, a critique of the high modernist project of state management of the environment. The increasing profile of toxic hazards undermined faith in the expertise which underpinned technocracy. As such, the events at Smarden helped to galvanize emergent environmentalism within the rubric of a 'crisis in trust'.<sup>148</sup> Responding to the Government's proposed sea disposal plan in February 1964, M.P. James Hoy complained:

The Minister said ... that he had an assurance from so-called experts that this would be rendered harmless if it were to be dumped into the sea at a particular distance but, after all, it was the experts who advised on the use of this material to begin with and they proved to be wrong. So what greater assurance can we have

that another assurance, which the experts have given the Minister, that the stuff will do no harm to the fishing grounds, can be relied on?<sup>149</sup>

As Beck has observed, the prominent risks from human-generated hazards have placed scientists in an ambiguous position, as both the originators of toxic threats and the specialists required to neutralize or remove them.

Douglas Good, a scientist, was dissatisfied with the secretive expertise of the Government and the professional reticence of the British Veterinary Association. Like Carson, he initiated a media campaign against the pervasive use of toxic chemicals by assuming the non-scientific and non-professional role of a storyteller. His BBC Radio broadcast was entitled, 'The Smarden Story'. Similarly, he circulated his 'short story' through the news media and through the publications of organizations - anti-fluoridation and organic - which opposed technocratic manipulation of the environment. Moreover, as Robert Waller, the newly appointed editor of *Mother Earth*, demonstrated, this opposition was often grounded in an explicitly emotive and non-scientific 'ecology'. When Good turned his attention to factory farming, he despaired: 'I venture to forecast that before the turn of the century, so-called civilized populations will be suffering from malnutrition of the mind and body, and this in spite of education for all and an abundance of food in the shops and on the larder shelves ....<sup>150</sup>

Smarden was the 'village of fear' over which hung 'the threat of death ...for nine months'.<sup>151</sup> Writing in 1965, Coleman-Cooke referred to the 'long shadows which fell over the village'. Smarden, in turn, has cast long shadows. Like the persistent pesticides that drew the ire of Carson and Good, the memory of Smarden has 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 number of cases. Twelve years later, a perceived 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>152</sup> Tellingly, when the Countess of Mar pursued this connection in the House of Lords in 1996, she sought ‘details about the incident known as “Smarden poisoning” which occurred between June 1963 and March 1964 at the government factory manufacturing the pesticide fluoroacetamide...’.<sup>153</sup> Similarly, the national press reported that the residents of Smarden suspected that the fluoroacetamide incident had been ‘a Government-controlled experiment ... and a cover-up’ which had produced BSE. Significantly, the scientist who promoted the links between Smarden and BSE was identified as an independent biologist. Media reports pitted him against ‘GOVERNMENT-BACKED ORTHODOXY’.<sup>154</sup> Conflicting expertise surrounding public health, agriculture, and animal welfare starkly demonstrated the struggle to manage rationally the environment - from fluoroacetamide to BSE.

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<sup>1</sup> John Coleman-Cooke, *The harvest that kills* (Odhams Books Limited, London, 1965), p. 125.

<sup>2</sup> R.H. Lutts, ‘Chemical fallout: Rachel Carson’s *Silent Spring*, radioactive fallout and the environmental movement’, *Env. Rev.* **9**, 211-225 (1985) at 211; Linda Lear, *Rachel Carson: witness for nature* (Penguin Books, London, 1997); M.J. Walker, ‘The unquiet voice of *Silent Spring*: the legacy of Rachel Carson’, *The Ecologist* **29**, 322-325 (1999); Lawrence Buell, ‘Toxic discourse’, *Crit. Inquiry* **24**, 639-655 (1998).

<sup>3</sup> Gary Kroll, ‘The “Silent Springs” of Rachel Carson: mass media and the origins of modern environmentalism’, *Publ. Und. Sci.* **10**, 403-420 (2001). And see Hal Rothman, *The greening of a nation?: environmentalism in the United States since 1945* (Harcourt Brace College Publishers, Fort Worth, 1998). See, also, Priscilla Coit Murphy, *What a book can do: the publication and reception of Silent Spring* (University of Massachusetts Press, Amherst and Boston, 2005).

<sup>4</sup> BBC 10 O’Clock Programme (Home Service News), 2 October 1963 [typescript], National Archives, Kew [hereafter NA]: MAF 35/1017.

<sup>5</sup> Kroll, *op. cit.* (note 3), pp. 413-416. For further analysis of the television programme, see Linda Lear, ‘Bombshell in Beltsville: the USDA and the challenge of “Silent Spring”’, *Agr. Hist.* **66**, 151-170 (Spring 1992). For a ‘fable of legitimacy’, see Jean-François Lyotard, ‘A postmodern fable’, *Yale J. Crit.* **6**, 237-247 (1993). For a concise and interesting examination of ecology as both a postmodern critique of legitimacy and a logical extension of the modernist project, see George Myerson, *Ecology and the end of postmodernity* (Icon Books, Duxford, Cambridge, 2001).

<sup>6</sup> Jon Agar, ‘What happened in the sixties?’ *Br. J. Hist. Sci.* **41**, 567-600 (2008). In addition, see *idem*, *Science in the twentieth century and beyond* (Polity, Cambridge, 2012), pp. 403-432.

<sup>7</sup> Vincent Wigglesworth, ‘DDT and the balance of nature’, *Atlantic Monthly*, 1945, reprinted in *idem*, *Insects and the life of man* (Chapman and Hall, London, 1976), pp. 13-30.

<sup>8</sup> Other than contemporary accounts, such as Coleman-Cooke, *op. cit.* (note 1), pp. 120-132, the only historically informed analysis of Smarden is John Sheail, *Pesticides and nature conservation: the British experience 1950-1975* (Clarendon Press, Oxford, 1985), pp. 182-185.

<sup>9</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.

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- <sup>10</sup> R. Allcroft and J.S. Jones, 'Fluoroacetamide poisoning. I. Toxicity in dairy cattle: clinical history and preliminary investigations', *Vet. Rec.* **84**, 399-402 (1969); and R. Allcroft, F.J. Salt, R.A. Peters, and M. Shorthouse, 'Fluoroacetamide poisoning. II. Toxicity in dairy cattle: confirmation of diagnosis', *Vet. Rec.* **84**, 403-09 (1969).
- <sup>11</sup> 'West Ashford Rural District Council Minutes of a special meeting of the council, Ashford, Monday, 17 February 1964, West Ashford Rural District Council, Kent History and Library Centre, Maidstone, UK [hereafter *WARDC*], p.4, RD/AW/AM1/37.
- <sup>12</sup> P.N.N. Moore to Paul McQuail, 30 October 1963, NA: MAF 35/1017, 215d.
- <sup>13</sup> B.W.J. Wulff to F.D.T. Good, 18 July 1963, NA: HLG 131/326. Although it exonerates entirely Rentokil, a recent company history identifies the Smarden incident as 'perhaps the lowest point in the company's history'. Rob Gray, *The pest detectives: the definitive history of Rentokil* (Harriman House, Petersfield, Hampshire, 2015), p. 102.
- <sup>14</sup> D.S. Papworth, 'Investigation of alleged poisoning to farm livestock at Smarden, Kent', 2 August 1963, NA: MAF 35/1017.
- <sup>15</sup> W.E. Crump [Memorandum], NA: MAF Tay 25724.
- <sup>16</sup> 'Industrial waste inquiry', *The Guardian*, 26 February 1964, p.2.
- <sup>17</sup> William Deedes, 'Agricultural land (fluoroacetamide poisoning)', Hansard, HC Deb, 19 March 1965, vol. 708, cc. 1739-50.
- <sup>18</sup> Stanley P. Johnson, *The politics of environment: the British experience* (Tom Stacey, London, 1973), pp. 16-17. For Carson, see pp. 73-75.
- <sup>19</sup> Rachel Carson, *Silent Spring* (1962; reprinted by Houghton Mifflin, Boston, 1987), p. 9.
- <sup>20</sup> Kroll, *op. cit.* (note 3), p. 415.
- <sup>21</sup> 'The night in June a foxhound went mad', *op. cit.* (note 9); F.D.T Good to W.F. Deedes, 20 February 1964, NA: MAF 35/1018, 177b; and F.D.T. Good to Sir Rudolph Peters, 21 January 1964, Sir Rudolph Peters Correspondence, Department of Special Collections, Bodleian Library, University of Oxford. [hereafter *RPC*], MS.Eng.misc.b258, Files E.50 and 62,
- <sup>22</sup> F.D.T. Good to J.L. Griggs, 6 September 1963, NA: MH 143/160. For industrial fluorine pollution, see Kenneth Mellanby, *Pesticides and pollution* (The Scientific Book Club, London, 1967), pp. 39-41.
- <sup>23</sup> Douglas Good, quoted in 'The night in June a foxhound went mad', *op. cit.* (note 9). Reprinted as F.D.T. Good, 'Pesticides and the Smarden Affair', *Mother Earth* **13**, 87-93 (April, 1964) at 91.
- <sup>24</sup> F.D.T. Good to Sir Rudolph Peters, 21 January 1964, *RPC*, MS.Eng.misc.b258, Files E.50 and 62. Guenther Schwab, *Dance with the devil: a dramatic encounter*, English translation (Geoffrey Bles, London, 1963); and Jonathan Olsen, *Nature and nationalism: Right-Wing ecology and the politics of identity in contemporary Germany* (St Martin's Press, New York, 1999), pp. 80-83.
- <sup>25</sup> Roy Ingleton, *Kent Disasters* (Pen & Sword Books Ltd., Barnsley, 2010), p. x. For the size of Smarden, see Jenni Rodger, *Smarden: a pictorial history* (Meresborough Books, Rainham, Kent, 1982), p. 4.
- <sup>26</sup> J.S.T. Jones to R. Allcroft, 17 July 1963, NA: MAF 35/1017.
- <sup>27</sup> Rodger, *op. cit.* (note 25), p. 6.

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<sup>28</sup> See Philip Conford, *The origins of the organic movement* (Floris Books, Edinburgh, 2001), pp. 28-43; and David Grigg, *The world food problem*, 2<sup>nd</sup> edn (Blackwell, Oxford, 1993), pp. 120-127.

<sup>29</sup> Brian Harrison, *Seeking a role: the United Kingdom 1951-1970* (Clarendon Press, Oxford, 2008), pp. 175, 128-132; and David Grigg, *English agriculture: an historical perspective* (Basil Blackwell, Oxford, 1989).

<sup>30</sup> See Martin Brooks *et al*, *Smarden 2000* (Smarden Local History Society, Smarden, 2000), pp. 17-18.

<sup>31</sup> Rodger, *op. cit.* (note 25), pp. 4, 28-32.

<sup>32</sup> J.D. Casswell to The Secretary to the Ministry of Agriculture & Fisheries, 22 July 1963; and A.G. Stirk, 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', *op. cit.*(note 9) , p.11.

<sup>33</sup> See Raymond Williams, *The country and the city* (The Hogarth Press, London, 1985); and James Winter, *Secure from rash assault: sustaining the Victorian environment* (University of California Press, Berkeley, 1999), especially at pp. 166-88 for the long-standing tensions between the 'country and the city'.

<sup>34</sup> 'Smarden factory: council's order', *Kentish Express*, 16 August 1963, NA: MAF 35/1017, 128.

<sup>35</sup> Minutes of the monthly meeting, Monday, 30 September 1963, *WARDC*, RD/AW/AM1/37.

<sup>36</sup> John Farr, 'Fluoroacetamide', *Hansard*, HC Deb, 11 February 1964, cc. 333-46.

<sup>37</sup> William Deedes, 'Agricultural land (fluoroacetamide poisoning)', *Hansard*, HC Deb, 19 March 1965, vol. 708, cc. 1739-50. For his account of the Smarden incident, see W. F. Deedes, *Dear Bill: W. F. Deedes reports* (Macmillan, London, 1997), pp. 188-205. 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', *New York Review of Books* **60**, 18-20 (23 May 2013) at 18.

<sup>38</sup> W.G. Hoskins, *The making of the English landscape* (1955; reprinted by Penguin Books, London, 1985), p. 299. Hoskins helped to establish the sub-discipline of 'landscape history' in the UK.

<sup>39</sup> David Matless, *Landscape and Englishness* (Reaktion Books, London, 1998), pp. 279-80. In addition, see Meredith Veldman, *Fantasy, the bomb, and the greening of Britain: romantic protest, 1945-1980* (Cambridge University Press, 1994).

<sup>40</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', *op. cit.* (note 9), at subsection entitled, 'A shabby building'.

<sup>41</sup> See Edmund Russell, *War and nature: fighting humans and insects with chemicals from World War I to Silent Spring* (Cambridge University Press, 2001); *idem*, "'Speaking of annihilation": mobilizing for war against humans and insect enemies, 1914-1945', *J. Amer. Hist.* **82**, 1505-1529 (1996); Thomas Dunlap, *DDT: scientists, citizens, and public policy* (Princeton University Press, 1981); John H. Perkins, 'Reshaping technology in wartime: the effect of military goals on entomological research and insect-control

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practices’, *Tech. & Cult.* **19**, 169-86 (1978); and Lear, *Rachel Carson, op. cit.* (note 2), p. 119. Sabine Clarke, ‘Rethinking the post-war hegemony of DDT: insecticides, research and the British colonial empire’, in *Environment, health and history* (ed. Virginia Berridge and Martin Gorsky), pp. 133-153 (Palgrave Macmillan, Basingstoke, 2012) includes a useful account of war-time investigations of DDT in Britain.

<sup>42</sup> H. McCombie and B.C. Saunders, ‘Fluoroacetates and allied compounds’, *Nat.* **158**, 382-385 (14 September 1946).

<sup>43</sup> L.H. Weinstein and A Davison, *Fluorides in the environment: effects on plants and animals* (CABI Publishing, 2004), pp. 224-230.

<sup>44</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, *op. cit.* (note 1), pp. 124-25.

<sup>45</sup> Carson, *op. cit.* (note 19), p. 16.

<sup>46</sup> See John H. Perkins, ‘Reshaping technology in wartime: the effect of military goals on entomological research and insect-control practices’, *Tech. & Cult.* **19**, 169-86 (1978).

<sup>47</sup> Hannah Gay, ‘Before and after *Silent Spring*: from chemical pesticides to biological control and integrated pest management – Britain, 1945-1980’, *Ambix* **59**, 88-108 (2012) at 93, fn. 17.

<sup>48</sup> Alexander G. Ogston, ‘Peters, Sir Rudolph Albert (1889-1982)’, rev. *Oxford Dictionary of National Biography* (Oxford University Press, 2004) [<http://www.oxforddnb.com/view/article/31542>, accessed 11 June 2014].

<sup>49</sup> Rudolph Peters, ‘Fluoroacetamide’, *New Sci.*, 12 February 1964, p. 410.

<sup>50</sup> *Ibid.*, p. 411.

<sup>51</sup> See Éric Darier, ‘Foucault and the Environment’, in *Discourses of the environment* (ed. *idem*), pp. 1-33 (Blackwell Publishers, Oxford, 1999) at p. 23.

<sup>52</sup> John H. Perkins, ‘Insects, food, and hunger: the paradox of plenty for U.S. entomology, 1920-1970’, *Env. Rev.* **7**, 71-96 (1983). On Cold War neo-Malthusianism and the environment, see: Björn-Ola Linnér, *The return of Malthus: environmentalism and post-war population-resource crises* (White Horse Press, Isle of Harris, 2003); and Thomas Robertson, *The Malthusian moment: global population growth and the birth of American environmentalism* (Rutgers University Press, New Brunswick, N.J, 2012).

<sup>53</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>54</sup> Mellanby, *Pesticides, op. cit.* (note 22), pp. 148-54, makes a similar point.

<sup>55</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.

<sup>56</sup> J.D. Casswell to The Private Secretary [Jean Arthur], 7 September 1963, NA: MAF 35/1017, 187; Norton, Rose, Botterll & Roche to S.J.B. Hurden, The Ministry of Housing and Local Government, 20 September 1963, NA: HLG 131/326; and Good, ‘Pesticides and the Smarden Affair’, *op. cit.*(note 23), pp. 87-93. Fluoroacetamide was registered in

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the US in 1972, restricted in 1978, and banned in 1989. See Weinstein and Davison, *op. cit.* (note 43), p. 230.

<sup>57</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* (His Majesty's Stationery Office, London, 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* (Her Majesty's Stationery Office, London, 1953); *Review of the persistent organochlorine pesticides: report of the Advisory Committee on Poisonous Substances Used in Agriculture and Food Storage* (Her Majesty's Stationery Office, London, 1964); Solly Zuckerman, 'Opening address', in Coleman-Cooke, *op. cit.* (note 1), pp. 11-16; *idem, Monkeys, men and missiles: an autobiography, 1946-1988* (Collins, London, 1988), pp. 131-144. For an excellent contemporary summary of the shortcomings of legislative safeguards against pesticide residues and hazards in Britain, see H. Martin, 'Present safeguards in Great Britain against pesticide residues and hazards', *Res. Rev.* **4**, 2-32 (1963).

<sup>58</sup> Mellanby, *Pesticides*, *op. cit.* (note 22), 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* (Perseus Press, Oxford, 2002).

<sup>59</sup> G.O. Lace, 'Poisoning of animals in Merthyr Tydfil and Smarden minute', NA: MAF 35/1017, 185.

<sup>60</sup> Benjamin Ross and Steven Amter, *The polluters: the making of our chemically altered environment* (Oxford University Press, 2010), pp. 4, 34; and Devra L. Davis, Maryann Donovan, and Arlen Blum, 'Afterword', in Joyce Egginton, *The poisoning of Michigan* (Michigan State University Press, East Lansing, Michigan, 1980), p. 334.

<sup>61</sup> Peter Dear, 'Mysteries of state, mysteries of nature: authority, knowledge and expertise in the seventeenth century', in *States of knowledge: the co-production of science and social order* (ed. Sheila Jasanoff), pp. 206-224 (Routledge, London, 2006) at p. 220.

<sup>62</sup> See Ulrich Beck, *Risk society: towards a new modernity*, English translation by Mark Ritter (Sage Publications, London, 1992).

<sup>63</sup> Sheail, *Pesticides and nature conservation*, *op. cit.* (note 7), 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', *Vet. Rec.* **73**, 223-33 (11 March 1961); and Mellanby, *Pesticides*, *op. cit.* (note 22), pp. 137-41.

<sup>64</sup> Carson, *op. cit.* (note 19), p. 25.

<sup>65</sup> Frank Graham, Jr., *Since Silent Spring* (1970; reprinted by Pan/Ballantine, London, 1972), pp. 78-83.

<sup>66</sup> Mellanby, *Pesticides*, *op. cit.* (note 22), p. 137.

<sup>67</sup> *Punch*, 6 March 1963, reprinted in Harrison, *op. cit.* (note 29), p. 134.

<sup>68</sup> 'The wrong road', *Kent & Sussex Courier*, 24 January 1964, NA: MAF 35/1018.

<sup>69</sup> Alastair G. Thomson, 'Murder weapon', *The Guardian*, 3 October 1963, p. 8.

<sup>70</sup> G.H. Lowe to F.D.T. Good, 15 July 1963, NA: MAF 35/1017, 131B. And see Oliver MacDonagh, 'The nineteenth-century revolution in government: a reappraisal', *Hist. J.* **1**, 52-67 (1958).

<sup>71</sup> Albert Weale, *The new politics of pollution* (Manchester University Press, 1992), p. 15.

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- <sup>72</sup> ‘Council take action on Smarden “smell”’, *Kent Messenger*, 16 August 1963, NA: MAF 35/1017, 128.
- <sup>73</sup> J.D. Casswell to the Secretary to the Ministry of Agriculture and Fisheries, 22 July 1963, NA: MAF 35/107, 161.
- <sup>74</sup> See Ben Pontin, ‘The secret achievements of nineteenth-century nuisance law: *Attorney General v Birmingham Corporation* (1858-95) in context’, *Env. Law & Man.* **19**, 271-90 (2007). B.W. Clapp, *An environmental history of Britain since the Industrial Revolution* (Longman, Harlow, Essex, 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* (Ohio University Press, Athens, Ohio, 2006), pp. 110-131. On the London smog of 1952, see *ibid.*, pp. 159-73; Peter Brimblecombe, *The Big Smoke: A history of air pollution in London since medieval times* (Routledge, London, 1987), pp. 161-178; and Christine L. Corton, *London fog: the biography* (The Belknap Press, Cambridge, Mass, 2015).
- <sup>75</sup> Keith Joseph to Christopher Soames, 10 September 1963, NA: MAF 35/1017, 150. The Alkali Act passed July 1863. See Roy M. MacLeod, ‘The Alkali Acts administration, 1863-84: the emergence of the civil scientist’, *Victorian St.* **9**, 85-112 (1965) at 90; and, see, Peter Reed, ‘The Alkali inspectorate 1874-1906: pressure for wider and tighter regulation’, *Ambix* **59**, 131-151 (1965).
- <sup>76</sup> Keith Joseph to Christopher Soames, 26 November 1963, NA: HLG 131/326.
- <sup>77</sup> Christopher Soames to Keith Joseph, 17 November 1963, NA: HLG 131/326.
- <sup>78</sup> ‘Smarden factory health menace? Mystery of dairy herd casualties’, *Ashford Examiner*, 26 July 1963, NA: MAF 35/1017 131B.
- <sup>79</sup> Keith Joseph to Christopher Soames, 26 November 1963, NA: HLG 131/326.
- <sup>80</sup> A.G. Stirk, Clerk of the Kent River Board, to Paul McQuail, 9 October 1963, NA: MAF 35/1017, 192/2.
- <sup>81</sup> West Ashford Rural District Council to the Secretary, Ministry of Agriculture, Fisheries and Food, 23 August 1963, NA: HLG 131/326.
- <sup>82</sup> ‘Firm to stop making poison spray’, *The Kent and Sussex Courier*, 4 October 1963, p. 13.
- <sup>83</sup> ‘Background note’, NA: HLG 131/326.
- <sup>84</sup> Paul Weindling, ‘From infectious to chronic diseases: changing patterns of sickness in the nineteenth and twentieth centuries’, in *Medicine in society: historical essays* (ed. Andrew Wear), pp. 303-316 (Cambridge University Press, 1992).
- <sup>85</sup> Lewis Herber [Murray Bookchin], *Our synthetic environment* (1962; reprinted by Jonathan Cape, London, 1963). And see Yaakov Garb, ‘Rachel Carson’s *Silent Spring*’, *Dissent*, 539-546 (Fall, 1995); Robert Gottlieb, *Forcing the spring: the transformation of the American environmental movement* (Island Press, Washington, D.C., 1993), p. 87.
- <sup>86</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>87</sup> W.F. Deedes to Christopher Soames, 18 September 1963, NA: HLG 131/326.
- <sup>88</sup> Letter from Norton, Rose, Botterell & Roche, 15 August 1963, NA: HLG 131/326.
- <sup>89</sup> ‘Smarden factory: council’s order’, *Kentish Express*, 16 August 1963, NA: MAF 35/1017, 128.
- <sup>90</sup> F.D.T. Good to J.L. Griggs, 6 September 1963, NA: MH 148/60.

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- <sup>91</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>92</sup> See F.D.T. Good to J.L. Griggs, 6 September 1963; and H.M. Elliott to J.L. Griggs, 13 September 1963, NA: MH148/160.
- <sup>93</sup> H.M. Elliott, 'Smarden – West Ashford Rural District Council. Poisoning of animals by effluent from Midox Factory', 28 August 1963. Although Elliott contended that Good had received his data from the 'County Analyst', Elliott's subsequent correspondence with Griggs indicated that he did not know the source of Good's data, and was puzzled by it. We can speculate that Good was using the information that he had obtained from the de la Warr Laboratories, and was, indeed, ahead of Government scientists in his identification of the problem.
- <sup>94</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>95</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>96</sup> D.H. Phillips, 'Letters to the editor. "Mystery" poisoning of animals', *Vet. Rec.* **75**, 1124 (26 October 1963). 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>97</sup> [Typescript of Radio News Interview], 'BBC Radio News', 2 October 1963, NA: MAF 35/1017, 186.
- <sup>98</sup> J.G. Carnochan to J. Hensley, 18 October 1963, NA: MAF 35/1017, 210.
- <sup>99</sup> G.O. Lace, 'Poisoning of animals in Merthyr Tydfil and Smarden Minute', 3 October 1963, NA: MAF 35/1017, 185. And see Joni Seager, *Carson's Silent Spring: a reader's guide* (Bloomsbury, London, 2014), pp. 83-96, for her discussion of Carson's ecological 'chain of interconnectedness'.
- <sup>100</sup> 'Poison Factory Man Ill', *Kent & Sussex Courier*, 17 January 1964, p. 6.
- <sup>101</sup> 'Ocean dump for poison soil. 2,000 tons to go in deep water', *Kent & Sussex Courier*, 7 February 1964, p. 13.
- <sup>102</sup> Dr E.W. Brentnall to Sir Rudolph Peters, 3 June 1964; and Rudolph Peters to E.W. Brentnall, 8 June 1964, *RPC*, MS.Eng.misc.b258, Files E.50 and 62. For a very full account, see Dr E.W. Brentnall to W.F. Deedes, 28 January 1964, NA: MH 143/160.
- <sup>103</sup> Quoted in Weinstein and Davison, *op. cit.* (note 43), p. vii.
- <sup>104</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', *Twent. Cent. Br. Hist.* **21**, 330-349 (2010); Brian Martin, 'Analyzing the fluoridation controversy: resources and structures', *Soc. Stud. Sci.* **18**, 331-63 (May 1988); and Joe Mullen, 'History of water fluoridation', *Brit. Dental Jr.* **199**, 1-4 (2005).

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<sup>105</sup> Christopher Sellers, 'The artificial nature of fluoridated water: between nations, knowledge, and material flows', in *Landscapes of exposure: knowledge and illness in modern environments* (ed. Gregg Mitman, Michelle Murphy, and Christopher Sellers) *Osiris*, 2<sup>nd</sup> series, **19**, 182-200 (2004).

<sup>106</sup> Reilly, *op. cit.* (note 104), pp. 126-27, 150-53.

<sup>107</sup> Ross and Amter, *op. cit.* (note 60), p. 56.

<sup>108</sup> 'Now it is "no" to fluoride', *Kent & Sussex Courier*, 6 December 1963, p. 5.

<sup>109</sup> 'Fluoride in the water? "Yes" say the medical men', *Kent & Sussex Courier*, 31 January 1964, p. 7.

<sup>110</sup> F.D.T. Good, 'Pesticides', *The Guardian*, 28 December 1963, p. 11.

<sup>111</sup> F.D.T. Good, 'Pesticides and the Smarden Affair' (National Pure Water Association, Huddersfield, Yorks, 1964); and F.D.T. Good to Sir Rudolph Peters, 21 January 1964, *RPC*, MS.Eng.misc.b258, Files E.50 and 62. Peters was displeased that a letter from him to the Secretary of the NPWA had been reprinted in Good's booklet without his permission.

<sup>112</sup> Fergus Cashin, 'Medicine and mothers-to-be', *Daily Sketch*, 6 January 1964, NA: MAF 35/107. On thalidomide and expertise, see Arthur Daemmrich, 'A tale of two experts: thalidomide and political engagement in the United States and West Germany', *Soc. Hist. Med.* **15**, 137-158 (2002).

<sup>113</sup> See Timothy Cooper and Sarah Bulmer, 'Refuse and the "Risk Society": the political ecology of risk in inter-war Britain', *Soc. Hist. Med.* **26**, 246-266 (2013); and Frank Fischer, *Citizens, experts, and the environment: the politics of local knowledge* (Duke University Press, Durham, N.C., 2000) for the importance of placing different scientific and lay communities in their social – and local - contexts.

<sup>114</sup> Carson, *op. cit.* (note 19), p. 16. In addition, see Russell, *op. cit.* (note 41); and Paul Julian Weindling, *Epidemics and genocide in Eastern Europe, 1890-1945* (Oxford University Press, 1999) for the relationships between insecticides and chemical and biological warfare.

<sup>115</sup> This is the point made by Lutts, *op. cit.* (note 2).

<sup>116</sup> E.H. Bronner quoted in, Reilly, *op. cit.* (note 85), p. 51.

<sup>117</sup> E. Essig quoted in *ibid*, p. 54. For *Dr Strangelove*, see p. 43.

<sup>118</sup> Egon Ronay, 'Poison sprays', *Sunday Telegraph*, 29 September 1963, NA: MAF 113/619.

<sup>119</sup> See, for example, Gottlieb, *op. cit.* (note 85).

<sup>120</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>121</sup> Hansard, HC Deb, 11 February 1964, cc. 333-46.

<sup>122</sup> 'Old Gert dies for science', *Daily Herald*, 20 December 1963, NA: MAF 35/1017

<sup>123</sup> J. Hensley, 'Copy of manuscript minute. Weybridge report on Smarden', 10 December 1963, NA: MAF 35/1017, 227.

<sup>124</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>125</sup> See Hansard, HC Deb, 3 February 1964, cc. 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. J.A. Tarr, *The search for the ultimate sink: urban pollution in historical perspective* (University of Akron Press, 1996).
- <sup>126</sup> F.D.T. Good quoted in 'It's the end for poor Gert', *Kent Messenger*, 20 December 1963, NA: MAF 35/107.
- <sup>127</sup> G.H. Lowe to F.D.T. Good, 15 July 1963, NA: HLG 131/326.
- <sup>128</sup> F.D.T. Good to Sir John Ritchie, 11 September 1963, NA: MAF, Tay 25724.
- <sup>129</sup> Bill Deedes to Christopher Soames, 25 September 1963; and 16 August and 9 September 1963, NA: HLG 131/326.
- <sup>130</sup> 'Poison hush-hush', *op. cit.* (note 124).
- <sup>131</sup> West Ashford Rural District Council Minutes of a special meeting of the council, Ashford, Monday, 17 February 1964; Letter from Bill Deedes to J.L. Griggs, 8 March 1964, in West Ashford Rural District Council Minutes, Monday 23 March 1964; and Council Minutes, 27 April 1964, *WARDC*, RD/AW/AM1/37.
- <sup>132</sup> T.A.R. Chipperfield, 'Letters to the editor: toxic chemicals', *Vet. Rec.* **75**, 1392 (14 December 1963).
- <sup>133</sup> Anne Hardy, 'Professional advantage and public health: British veterinarians and the state veterinary services, 1865-1939', *Twentieth Cent. Br. Hist.* **14**, 1-23 (2003).
- <sup>134</sup> D.H. Phillips, 'Letters to the editor: "Mystery" poisoning of animals', *Vet. Rec.* **75**, 1393 (14 December 1963). For further correspondence, see: F.D.T. Good, 'Letters to the editor: "mystery" poisoning of animals', *ibid.*, 1310; *idem.*, 'Letters to the editor: toxic chemicals', *Vet. Rec.* **76**, 1256 (31 October 1964); *idem.*, 'Letters to the editor. Toxicity of organic fluorine compounds', *ibid.*, 17-18; D.H. Phillips, 'Letters to the editor. Toxicity of organic fluorine compounds', *ibid.*, 18; R.K. Sharratt, 'Letters to the editor. Editorial censorship', *ibid.* (4 January 1964), 19.
- <sup>135</sup> F.D.T. Good, 'Letters to the editor. Factory farming', *ibid.* (20 June 1964), 708.
- <sup>136</sup> Ruth Harrison, *Animal machines* (Vincent Stuart Ltd, London, 1964).
- <sup>137</sup> *Ruth Harrison Advisory Group, Farm Animal Welfare: Summary of Proposals* (Education Services and Ruth Harrison, London, [1965]). In addition, see R. Harrison, 'Case study: farm animals', in *Environmental dilemmas: ethics and decisions* (ed. R.J. Berry), pp. 118-135 (Chapman & Hall, London, 1993).
- <sup>138</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, NA: MAF 113/619.
- <sup>139</sup> Deedes, *Dear Bill*, *op. cit.* (note 37), pp. 191-94.
- <sup>140</sup> See, for example, Stanley Baker, 'Rat poison firm to pay: concern over soil disposal', *The Guardian*, 18 February 1964, p. 16.
- <sup>141</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.
- <sup>142</sup> Johnson, *op. cit.* (note 18), pp. 73-74.
- <sup>143</sup> Peter Walker, *Staying power: an autobiography* (Bloomsbury, London, 1991), pp. 76-77; Kevin Jefferys, *Anthony Crosland: a new biography* (Richard Cohen Books, London, 1999), pp. 142-45; Andy Beckett, *When the lights went out: Britain in the*

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*seventies* (Faber and Faber, London, 2009), pp. 33-46; and Johnson, *op. cit.* (note 18), pp. 24, 133-79.

<sup>144</sup> Deedes, *Dear Bill*, *op. cit.* (note 37), pp. 193-94.

<sup>145</sup> Hansard, HC Deb. 19 March 1965, cc. 1741-1742.

<sup>146</sup> 'Industrial waste inquiry', *The Guardian*, 26 February 1964, p.2.

<sup>147</sup> See Kenneth Mellanby, *Waste and pollution: the problem in Britain* (Collins, London, 1992), pp. 55-56; and Veldman, *op. cit.* (note 39), p.222.

<sup>148</sup> On the 'crisis of trust' – real and apparent – see Onora O'Neill, *A Question of Trust* (Cambridge University Press, 2002). Timothy Cooper and Anna Green have produced several important social historical examinations of another UK disaster of the 1960s. Their analysis offers a different perspective on the ways in which environmental consciousness was constructed. By recovering the voices of 'locals', they have identified grassroots environmentalism, borne of local experience of everyday life. See 'The Torrey Canyon disaster of 1967, everyday life, and the "greening" of Britain', *Env. Hist.* (forthcoming, 2016); and 'Community and exclusion: the Torrey Canyon disaster of 1967', *J. Soc. Hist.* **48**, 892-909 (2015).

<sup>149</sup> James H. Hoy, 'Fluoroacetamide', Hansard, HC Deb, 11 February 1964, cc. 333-346.

<sup>150</sup> Robert Waller, 'The poisoners in our midst. Some implications of the Smarden affair', *Mother Earth* **13**, 82-85 (April 1964); F.D.T. Good, 'Letters to the editor. Toxic chemicals', *Vet. Rec.* **76**, 1256 (31 October 1964); and see Mark J. Smith, *Ecologism: towards an ecological citizenship* (University of Minnesota Press, Minneapolis, 1998).

<sup>151</sup> 'Village of fear smiles again', *People* [London], 19 January 1964, NA: MAF 35/1018.

<sup>152</sup> Kamal Ahmed, 'Death from CJD brings cluster in Kent to six', *The Guardian*, 4 August 1997, p.4.

<sup>153</sup> Countess of Mar, 'Smarden poisoning incident', Hansard, HL Deb, 6 June 1996, cc. 142 - 3WA.

<sup>154</sup> Kamal Ahmed, 'Death from CJD brings cluster in Kent to six', *The Guardian*, 4 August 1997, p.4; and 'Ashes of sick herd buried 8ft deep', [*Kentish Express*] 9 May 1996 [newspaper clipping supplied by Yvette Austin].