I changed something else

Chemicals and their Users in the British Home, 1930s to the 1980s

# Literature review

The use of chemicals in the home, and their gradual displacement by branded goods has been largely unexplored. Taking a broad approach to the topic of chemicals and their users in the British home is therefore necessary when locating this thesis in the existing historiography as there is no directly related previous research. However, applicable theories do exist and comparable examples are spread found across disciplines. The focus on users, rather than on the manufacturers, marketers or retailers as adopted by business historians such as William Reader, allows this thesis to tell a story about the demands, concerns and actions of consumers that is more nuanced than the passive acceptance of chemicals offered to them by industry.

Everything is made of chemicals, but since a thesis about everything is not a sensible proposition, I have selected chemicals used for household cleaning (carbon tetrachloride, sodas, Harpic), killing weeds (sodium chlorate, paraquat) and photographic development. Historian of technology Ruth Oldenziel's pointed out that technology was once defined by the 1978 Encylopeadia Britanica as "any means or activity by which man seeks to change or manipulate his environment".[[1]](#footnote-1) Chemicals used in the home and garden certainly fall into this category, and allow chemicals to be investigated as used technologies, rather than as chemistry which implies a different pursuit of knowledge and understanding. The domestic tasks or hobbies were chosen to incorporate activities carried out by women, men and young adults, which may illuminate differences in attitudes to chemicals perhaps through the different roles that chemicals play for these users. By addressing the deliberate invitation of chemicals into the home for these specific tasks, I aim to further understand public attitudes to chemicals in the face of increasingly restricted access to some chemicals and the ongoing debates about their long term effects on human health and the environment.

The chemicals were chosen to demonstrate a shift from buying a raw chemical to buying a branded product, the co-existence of raw chemicals alongside branded products, as well as the introduction and removal of chemicals from the market. For instance a chemical could be bought 'loose' at a chemist or other shop, then becomes branded for a particular task, perhaps with some added value through innovative packaging or inclusion of other functional chemicals, or perhaps not. In both instances the consumer is technically free to do what they want with the chemical once they get it home. I am interested in the relationship between the consumer and a chemical and to understand this better I will look at situations when a chemical is subsumed by a brand, such as in the case of carbon tetrachloride and Thawpit, or not, in the case of sodium chlorate. Consumers have to make adjustments when chemicals and branded products become withdrawn from sale, such as carbon tetrachloride, Thawpit, and paraquat. A chemical may become less visible as buying choices change and other alternatives become available, as in the case of soda. Some chemicals can be given alternative identities, or domesticated, through branding, such as the case with paraquat which was presented as an agricultural (or professional) preparation and a different product for domestic (or amateur) gardeners. I am interested in the adjustments consumers make to accommodate the chemicals they want to use, and how they may have to revise the place of chemicals in their home under the influence of government regulation.

The use of chemicals at home has to be considered within the context of state regulation on the sale of chemicals and product testing with regards to its safety. There has consistently been a blind spot regarding formal testing of chemicals used in the household, where safety has relied on epidemiology, that is data accumulated from reports of misadventures or crimes, and on information extrapolated from workplace or industrial exposure. This has been particularly applicable to chemicals that have been used widely and for a fairly long period, such as washing sodas or carbolic acid. New chemicals and formulations containing them have not b Extensive, and therefore expensive, safety testing was reserved for food additives and pharmaceuticals, justified by the high number of people exposed to this limited selection of chemicals, as compared to the far smaller number of industrial workers.[[2]](#footnote-2) Discussions on the acceptability of risks to consumers, who it was assumed voluntarily exposed themselves to such chemicals, and the workers who were thought to be involuntarily exposed during manufacture or application, extended to the families they may contaminate, but did not include comment on the weight of powerful labour unions advocating for better studies and controls, or the absence of such a force on behalf of domestic consumers.[[3]](#footnote-3) Consumers who paid to bring those chemicals into their homes were protected by the measures implemented to ensure the safety of those who worked in their manufacture, despite the type and duration of exposure of an industrial worker being quite different to that of a housewife, photographer or gardener.

Regulations on sale were implemented in anticipation of response to user actions and behaviour, perhaps of a tiny minority of users, rather than merely on the qualities of the chemicals themselves. Therefore, the changes in restrictions can tell us something about the users, and how the users are perceived by policy makers. The ongoing consultations and alterations to restrictions on chemicals in the name of addressing terrorism, including sodium chlorate as an explosive precursor, makes considering how chemicals are bought and used for domestic use timely.

Chemicals used in the household for domestic chores and hobbies are the principle way that people engage with chemicals, and therefore provide an important position from which to investigate and better understand the lay public's interaction with science in the 20th Century. ~~Until the Second World War,~~ unbranded chemicals were used in the home for tasks including cleaning, stain removal, pest eradication and for activities such as developing photographs. The number of branded chemical products increased during and after the war. Studying the 1930s to the 1980s means that a long view of the availability of unbranded and branded chemicals and chemical products, such as ready mixed photographic developers, or stain removers dedicated to blood, can be constructed and considered. Although many of the ideas, practices and possibly some of the products might have stayed the same, the upheaval and changes wrought through world wars and economic cycles of growth and depression that occurred between 1930 and the 1980s, as well as the development and dissemination of both knowledge and misinformation about chemicals, mean that the topic of domestic chemical use deserves examination.

### Do-it-yourself

This leads us to consider Steven Gelber's discussion of the rise of the do-it-yourself ethos in America, the pursuit of work-like recreation and the creation of domestic masculinity which he defines as jobs that were once done by male skilled workers coming to the home, being taken on by the male householder.[[4]](#footnote-4) Chemicals do not feature in these discussions of DIY practices but the arguments concerned with furniture making and home improvements, as well as the motivations behind carrying out DIY, are broadly applicable to the activities of cleaning, gardening and home processing examined in this thesis. Marco Wolf and Shaun McQuitty identified a number of reasons why people chose to do things themselves, including other products or services not being available, or the quality of those available not deemed suitable for the users' needs, as well as the satisfaction of completing a task in a self-reliant fashion.[[5]](#footnote-5)

### Cleanliness and homeliness

Dirt, the opposite of clean, has been described by Mary Douglas as 'matter out of place',[[6]](#footnote-6) which attributes to components of dirt the usefulness that they could potentially have if they were in their rightful place, in the same way as any plant can become a weed when it is not in the desired place. When a clean home means freedom from infection with viruses, bacteria or fungal spores, the entire household benefits, but there has been a societal expectation for twentieth century women to continue to shoulder the bulk of the duty to keep the interior clean, while men perhaps look after the outdoors items such as gutters, drains and gardens. The Sisyphean nature of the housework remains unchanged, and research questions of equality of division of labour and time spent on it has dominated studies. They repeatedly find that even when women have paid work outside the house, they still undertake the majority of domestic chores, including shopping for supplies to help them complete the housework.[[7]](#footnote-7)

Although research that challenges traditional, heteronormative, gendered division of housework has been undertaken, the outcome generally seems to be that no matter who makes up the household or who goes to work, housework remains divided less equally than the researchers (and participants) would consider ideal.[[8]](#footnote-8) The number of technological devices acquired to ease the burden of housework may be recorded and included in these time-focussed studies but the total variety of goods that are routinely bought to assist or speed and are used up in the chores, namely chemicals, have not been addressed. The ways that chemicals, conveniently packaged or not, can be used in caring for the home and garden forms the basis of my research questions in this thesis. If women and men do different housework tasks, is there also a difference in their attitude to and use of chemicals that can help?

Arguments about skill and expertise in housework abound, although overt discussion of the use of chemicals and chemical products are exceedingly rare. Judith McGaw suggested that notion of skilled and unskilled work is based in part on the idea that housework was natural rather than skilled. Skills relating to household work were deemed untechnological because they were common knowledge of women.[[9]](#footnote-9) Could this hold true even as housework incorporated more technological appliances to be operated, or required understanding increasingly complex composite fabrics and how they reacted to the variety of stain removal chemicals commonly in use?

The move towards documentation through household management manuals and formal training in home economics or domestic science drew out the technicalities associated with the methods and systems to be applied worked to make a body of work visible to others. Teaching also bridged a perceived gap in knowledge transfer between experienced, efficient women and their daughters, yet others argued that this scientization of housework undermined women's authority. Birgitte Soland has examined the push for modernisation of housework as stemming from the industrial workplace and how domestic science pushed women to develop better, faster systems and pride in their work. and whether women were working outside the home so had to perform housework in a compressed amount of time or not, efficiency in housekeeping was desirable and new products promised that women could achieve the same or better standards through less effort. However, the rise in easy to use products and easy to care for smooth, modern surfaces or even products that apparently negated care such as self cleaning ovens, was accompanied by commentary on the declining skill of housewives.

### Technologies of cleanliness

Histories of household cleanliness have been dominated by the practices and durable technologies associated with laundry. Joy Parr's study of washing machines in post-WW2 Canada is a key example, which highlights that widespread adoption of a new technology is dependent on the combination of availability of piped water and electricity, affordability of the machines themselves, as well as the needs and attitudes of users.[[10]](#footnote-10) With the advent of powered machines to assist in laundry, laundering became done privately indoors, where the machines can connect with utility supplies. Items drying on the line or worn are visible and available to be judged on cleanliness by neighbours or any passing person. The cleanliness of freshly laundered washing, especially white items, visually communicate the housewife's competence (or, if detergent advertising is to be believed, her ability to choose the correct product), and provide a public demonstration of the housewife's care of her family. The cleanliness of clothing was often commented on by visitors aiming to improve working class women's conditions, with women in apparently the same situation managing to achieve radically different standards of cleanliness.[[11]](#footnote-11) This demonstration of care through the provision of clean clothing has formed the touchstone for Ruth Schwartz Cowan's argument that despite the widespread use of labour saving devices such as automatic washing machines, total workload actually increased with the mechanised potential to reach an ever rising level of cleanliness. Shorter or less strenuous bouts of physical work were done, but were carried out more often than ever before.[[12]](#footnote-12)

The comparatively private, internal domestic environment and surfaces within it have also received attention, with Reeves writing about reform or charitable visitors to working class women at home, commenting on the cleanliness of the home and encouraging them to document expenditure on household consumables such as washing soda and soap.[[13]](#footnote-13) This invasion of the private home environment did not occur for those better off, further up the class ladder. Professional housekeepers kept full records of expenses and provisions bought, but researchers such as Tessa Boase have tended to want to focus on the 'human stories' rather than the 'minutiae' of practical information about chemicals and cleaning products. While stories of interpersonal relationships, feuds and squabbles are fascinating, knowing that a housekeeper washed up dishes into the 1960s without Fairy or other liquid detergerent that supplied freedom from grating hard soap and promised to be gentler on hands surely begs the question 'Why?'.[[14]](#footnote-14) Furthermore, the collection of this type of consumer information has since been left to market researchers, almost in competition with sociologists.

Increasing specialisation or diversity of cleaning products could be taken as a sign of modernisation. Graeme Gooday's study of electricity referred to the initial rejection of electric lighting by women as harsh and unflattering to their looks, showing every wrinkle. However, he does not refer to its effect on visual assessments of domestic cleanliness.[[15]](#footnote-15) The development of germ theories and of technologies that promised to clean at this almost microscopic level can be understood in the frame of modernisation. This is well illustrated by the topic of dust, which is visible to the human eye, but microscopic analysis of it revealed that dust was composed of and could harbour germs. Modern housewives switched dry dusting and mopping for damp to control dust, but spurred on by a greater knowledge of dust, was the invention and acceptance of vacuum cleaners. Vacuum cleaners became a way of modernising the housekeeping routine, and keeping up with the modern standards of cleanliness. Historian Emily Hankin included the vacuum cleaner in her investigation of the British consumer experience of domestic electricity, finding that their size, affordability and utility in helping the housewife achieve increasing standards of cleanliness meant that they were one of the electric consumer items that were readily taken up, quite early on in the expansion of the National Grid.[[16]](#footnote-16)

### Achieving cleanliness with chemicals - laundry

Christina Walkley and Vanda Foster's book about the care of Victorian clothes includes many examples of the use of a wide variety of unbranded chemicals (an exception being the bleach Parazone), although they take care to state that although methods requiring chemicals such as oxalic acid, sugar of lead, chloroform were known and available, plain soap and water was the first and most preferable option.[[17]](#footnote-17) This explains why the question of chemical use to assist the cleaning of domestic surfaces appears to be dominated by literature on the manufacture, advertising and sales strategies of soaps. However, as synthetic textiles and furnishing materials became available in the 1940s and 50s, a new market in specialised chemical cleaning products also opened up as some methods of stain removal, such as acetone, that were safe for natural fibres were not suitable for these new items and this has not been the subject of historical research. Similarly, the use of chemicals which appeared in Walkley and Foster's research on Victorian textiles have not had their stories followed into the 20th century.

Another branch of scholarly research on stained textiles has been written by historic textile conservators who have a special interest in understanding how items came to be stained, with a particular awareness of the significance of certain types of stain and how best to clean stained historic textiles considering their provenance and preservation needs.[[18]](#footnote-18) However, the conservators are less concerned with stain removal, as the items that they tend to write about are the totemic items significant because of their stains, such as Admiral Nelson's bloodstained jacket. Removing this stain would erase one of the most powerful visual signifiers present on the garment.

However, the histories of stain removal techniques have been overlooked, even though stain removal has to some extent been professionalised, and perhaps even masculinised through dry cleaning services. Domestic spot cleaning or stain removal methods require understanding the type of stain, the textile and the possible actions of available stain removers on both the stain and the textile, which means that to be successful is associated with expertise. Walkley and Foster claim that Victorians would have known what their fabrics were, as well as what stained them, because foods and household substances were made from known, natural products and that the 20th century housewife faced with unknown and unnatural products is at a disadvantage.[[19]](#footnote-19)

### Achieving cleanliness with chemicals - surfaces

As mentioned previously, there is little work on the use of chemicals to clean at home. Tom Fisher highlighted that a selling point for plastic products from ICI and Addis was specifically that they did not need any special products, that soapy water was enough.[[20]](#footnote-20) Rebecca Whyte's investigation of the histories of state monitored hygiene and domestic disinfection following outbreaks of disease between 1860 and 1920 considers more the role of chemicals in cleaning domestic surfaces. She identifies issues of safety and effectiveness as central to successful disinfection and highlights the distrust by municipal authorities of householders to do the task reliably themselves, either through using chemicals that were perilous and immediately harmful to the user, or perhaps worse, ineffective chemicals which would not halt the spread of disease through society. Whyte also found evidence of concerns within the authorities that the public's reliance on advertisements and old methods gave them a false sense of security in their fight against infection.[[21]](#footnote-21) This tension between disinfection by professionalised, authoritative agents, and the untrained public's use of disinfectants is of particular relevance to this thesis, as restricted access to chemicals is often justified on professional or amateur use.

Also important is Whyte's research on the public view of disinfection and the ready acceptance of products that integrated germicide into daily life,[[22]](#footnote-22) which can be compared to the acceptance of other chemicals and products arriving on the market later. The nineteenth century processes of determination and negotiation that scientists in government, academia and industry effectiveness and safety of different methods of disinfection that Whyte describes can be compared to the twentieth century evolution of understandings of and attitudes towards the effects of chemicals on organisms and in the environment.

Whyte also wrote a case study of uses and abuses of carbolic acid in British Victorian and Edwardian homes. She constructs a story of a chemical that generated significant media attention and became increasingly restricted due to the ways it could potentially be, and was, misused.[[23]](#footnote-23) These themes are echoed in the chemical case studies that I have assembled.

The sense of ever increasing standards of cleanliness can be related to a growing public awareness of the role of germs in disease, and in dirtiness, brought about through formal and informal education following as advances in laboratory methods of detection and observation. Although domestic users cannot be certain that their chosen method can eliminate germs, the visual, tactile and olfactory inspection available to indicate cleanliness has to stand in for the sophisticated equipment that scientists could access.

### Smells and relationship to cleanliness

The sense of smell cannot be turned off by will, and we continually experience a barrage of smells that invade our bodies, due to the interaction of odorant molecules with our nasal receptors. The literature on cultural significance of smells is dominated by Alain Corbain.

Where Corbain's analysis of smells is strictly theoretical, Joseph Jellinek writes about the industrial practicalities of working with scents and is a rarity among this type of author, who tend to focus on glamorous, luxury fragrances. Jellinek writes about everyday consumer products and asserts that scents can be used to deliver information about a product's safety, its strength or gentleness, its long lasting or fleeting action, its relationship to natural or synthetic.[[24]](#footnote-24) He argues that fragrance can modify how consumers perceive products, giving the example of a washing up liquid marketed as tough on grease, but with a scent that conveys how gentle it is on hands.[[25]](#footnote-25)From his writing, it is unclear how or why scents acquire these meanings, but their correct use is critical for user acceptance and therefore commercial success of products.

Jessamyn Neuhaus points out that almost every chemical product associated with housework is advertised in a way that highlights the removal of unwanted smells and their replacement with odours that signify that cleaning has taken place.[[26]](#footnote-26) By drawing attention to, and thus increasing domestic olfactory sensitivity, advertisements for household 'freshening' products multiplied on the 1950s American market, as identified by Suellen Hoye.[[27]](#footnote-27) The influence of the American market on the British was... *research this. Internationally operating companies?*

This continual reinforcement by advertising of the idea of cleanliness and other qualities being associated with product fragrances could be a self perpetuating (?) means of commercially produced scents acquiring meanings. By emphasising the importance of choosing the right tools for the job, tools that would result in the correct smell for the area or situation, Betty Friedan, writing in the 1960s, suggested that marketers encouraged a sense of professionalism among housewives confronted with the wealth of products.[[28]](#footnote-28) One of Neuhaus's key arguments about the proliferation of scented cleaning products is that the fragrances help the housewife and her efforts to be noticed and remarked upon.[[29]](#footnote-29) Even if housework is dutifully done out of sight, or there is no way to gauge how effectively germs have been removed, the noses of the other members of the household cannot help but notice that cleaning has taken place.

### Educating users about cleanliness

Advertisements are a method of educating users not only about the existence of the product, but about cleanliness in general and its relationship with germs, social expectations of cleanliness, how to achieve and recognise cleanliness. Neuhaus argues that adverts send messages about who uses the product, showing the effort (or lack of) to portray diverse users beyond white, middle class mothers. This focus on mothers emphasises that the housework is done in order to protect and care for the family. Men, again specifically fathers, are shown as inept, able to reach a reasonable standard of housework thanks to the use of certain products.

Adverts are not the only way that potential users gather information about cleanliness and effective methods of achieving it, they pick it up through their social interactions and daily experiences, including hearing it discussed between people, seeing images, and visiting other domestic environments. Home management manuals, often given to new brides but bought in vast numbers by women whom Dena Attar describes as 'isolated in their homes' seeking guidance on creating and maintaining a pleasant and harmonious home atmosphere. She links the rise of the household manual in late nineteenth century Britain to the enforced retreat of women from places of work outside the home, stating that when WW1 opened space for women in the workforce again, the demand for this type of book fell.[[30]](#footnote-30) The cycle started again when men returned from war and women returned focus to the home. Attar identifies the major groups of books as domestic economy, household medicine and childcare, servants and etiquette. For the purposes of this thesis, the relevant section of household manuals is that concerned with domestic economy, as this is where information and recipes for cleaning and gardening can be found. Household medicine also requires chemicals, but this is beyond the scope of this thesis, so the only part of household medicine that I am interested in is the first aid for poisoning with domestic chemicals. Whyte points out that despite awareness of corrosive sublimate (mercury chloride) as a poison in Mrs Beeton's Household Manual from 1859 onwards, there is no indication of why the chemical would have been in the house in order to poison people.[[31]](#footnote-31) A possible explanations could be that it had a use that was not covered by the household manual, photography for instance.[[32]](#footnote-32) [[33]](#footnote-33) Alternatively, mercury chloride was perhaps beginning to be used as a fungicide and pesticide for materials in the home, but was not yet considered to be advantageous to any other method available.

Other than self directed reading, formal education through school or college classes could also deliver and shape ideas about cleanliness. Access to science lessons, where transmission of germs may be covered in biology, or detergent properties in chemistry, has changed during the period studied. Between the 1930s and the 1980s, the school leaving age has risen from 14 to 16, as well as the systems of provision with the introduction of grammar schools and national curriculum.[[34]](#footnote-34) Boys and girls still receive quite different opportunities and classroom experiences. Home economics classes, offered either to young adult women or as part of school curriculum are a branch of education that are particularly relevant to how people might form attitudes to chemicals, and their choices to use them in their home or garden.

Home economics, which by taking on the mantle domestic science, tried to ally itself to the sciences through emphasising methodical working, making comparisons based on evidence and understanding something of the perhaps superficial chemical basis of textiles and cleaning materials. Dena Attar investigated the state of domestic science teaching and uptake in the 1980s and found that the adoption of scientific rationale was an attempt to appeal to boys as well as girls, to emphasise that the subject is not, as it had been traditionally seen, for less academically able students and to justify its continued provision in schools.[[35]](#footnote-35) The identity and worth of home economics as a school subject has been much debated, but however it is termed, the subject can be expected to deliver practical messages about how cleanliness can be achieved. Laundering had formed a considerable portion of the home economics curriculum until the 1950s, but with the increasing ubiquity of automatic washing machines, Attar found that the bulk of domestic science lessons in the 1980s focussed on food preparation, nutrition and consumer awareness.

# Gardening

I have chosen to look at garden tasks that may involve chemicalsfor two reasons. First, because the garden is a rich area for discussing domestic matters. The idea of home constructed as the domestic sphere to which women are confined makes the garden interesting, because of its position as home but also public, as although the garden is private property, what happens in the garden can be visible to outsiders, or affect neighbours and is therefore public to a certain degree. Neighbouring gardeners have a responsibility to one another, as both weeds and sprays applied in one garden can spread to another where they are not wanted. This is similar to the drift of smells and noises between houses, which may not be impeded by walls or windows. Second, including this area of domestic space is a way of ensuring a more gender-balanced approach to the topic of domestic chemicals than purely cleaning chemicals could allow. Rebecca Preston discusses Victorian and Edwardian suburban gardens and determines that masculine-feminine distinctions between parts of the garden are impossible to usefully make. These nuanced and blurred boundaries are not in evidence when Franklin Ginn describes the perpetuation by Dig for Victory propaganda of the traditional view of gardening as 'man's work', and handbooks advised to avoid useless 'ladies' tools that could not stand up to the necessary physicality of working the garden.[[36]](#footnote-36) This makes motivations for gardening with or without chemicals, which claim to reduce the number of physically demanding tasks, such as digging or weeding, of particular interest here. Who were the chemicals being marketed to, who was using them, when, where and why? Although decisions and undertaking may be shared in the choice and application of garden chemicals as they are concerning cleanliness of domestic interiors, a stereotypical (or traditional) division of labour may apply again.

In 1981 Stephen Constantine pointed out that popular gardening has not received much attention from historians,[[37]](#footnote-37) and for a rich subject that one might think would engage scholars looking for a fresh approach to domesticity or social history, very few have taken up the challenge. Articles for the journal *Garden History* concentrate on large ornamental gardens for wealthier families with gardening staff, created by famous designers,[[38]](#footnote-38) but do not discuss the use of chemicals, inherently precluded by the presence of ready manual labour to tend compost, weed and eliminate pests. Miles Hadfield briefly covered the fads and fashions of British middle and lower income gardening as 'an escape into nature and away from the mechanical world', which is somewhat contradicted by his unproblematised inclusion of labour saving paving, chemical sprays and 'horrifying marvels of science'.[[39]](#footnote-39) To escape into nature is to not accept nature as it is, but to use unnatural means to tame it.

Some twenty years after Constantine's lament, the social history of domestic gardening had not matured, being described as "in its infancy" by Mark Bhatti and Andrew Church.[[40]](#footnote-40) Jane Brown made a valiant attempt to get to the bottom of chemical use in popular gardening, essentially confirming that there is very little material available on the development and use of domestic garden pesticides.[[41]](#footnote-41)

The use of chemicals in the specialised and therefore niche gardening pursuit of plant breeding received has been written about by Helen Anne Curry who examined the use of radiation and colchicine in America by amateurs to cause mutations in plants, specifically polyploidy (the duplication of whole sets of chromosomes) which was associated with larger flowers, fruits and vegetables. She outlined how amateur gardeners read about the techniques in newspapers and gardening magazines, then purchased the drug over the counter at the pharmacy to treat seeds at home or sent seeds to facilities such as hospitals to be irradiated. Curry picked up on the concern of professional geneticists about the blurred boundaries that resulted from untrained, domestic use of colchicine as a mutagenic chemical tool, and the subsequent published articles associated with accidents causing bodily harm and the chemical's safe use, ideally in a laboratory. Safety does not appear to be a dominating concern for Curry's colchicine users, keen to improve plant varieties without apparent heed or question about what effects it could have on the amateur plant breeders themselves: the fact that it was available to anyone without question over the counter signalled to those users that it was safe for them to experiment with. The enthusiasm for colchicine faded when only they found that the results they sought were harder to come by than anticipated, rather than through any rejection of the use of a poisonous, mutagenic chemical. Using the traces left in their letters to scientists asking for information, and from letters to magazines reporting on their results, Curry built an image of domestic experimental (as opposed to chemotherapeutic) users of colchicine as keen amateur plant breeders driven by curiosity and ambition to develop competition winning flowers or more lucrative crop varieties.[[42]](#footnote-42)

Curry did not refer to Paige Johnson's work on atomic gardening in Britain in the 1950s and 60s, possibly due to the article's geographic and chronological constraints or perhaps simply because of the timeline processes of producing work for journals. Johnson profiled Muriel Howarth, a self styled science communicator who enthused about the potential for radioactivity to be used to improve food plants, as well as preserve their crops from decay, and thus abolish famine. She arranged the distribution of irradiated plant specimens to interested amateur gardeners who grew them then reported back on their performance and yields, as well as showed specimens at specially organised shows of atomic gardening.[[43]](#footnote-43) Both Curry and Johnson's papers with respect to radioactivity and plant breeding detail amateur gardeners participation in what is now called citizen science, where laypeople record and report back their observations to an academic team in order to increase the geographic reach and sample size that the scientists could handle themselves. Neither paper linked these dedicated, yet somewhat distanced efforts to apply radiation to living plants, to amateur gardening products associated with the fad for radioactive household products at the beginning of the 20th century and therefore did not enhance the study or understanding of chemicals in the home. The existence of products such as Radiolise showed that domestic gardeners could dose their plants at home, if it really did contain the three kinds of radiation it claimed to, right into the 1930s, rather than only relying on trained radiographers at scientific facilities to do it on their behalf.

As alluded to when talking about manual labour and gardening, class is bound up in questions about gardening. Having a garden at all says something about class, as does its size and what it is used for. A working class home with a garden or yard could use it to grow fruit and vegetables, or keep chickens or rabbits, all of which would supplement and save buying food, although giving space over to growing cheery and decorative flowers rather than foods necessary for survival also took place.[[44]](#footnote-44) Wealthier households, with larger gardens might devote the space to lawns, flower beds, shrubs and trees, but that they might also employ people to look after these. Margaret Wile's study of Victorian and Edwardian working class gardens manages to avoid comment on the use of chemical aids entirely, crafting a picture of canny, thrifty methods of fertilising the soil and dealing with pests, and learning about gardening through traditional rhymes.[[45]](#footnote-45) We know that chemicals were available, because adverts appeared in garden magazines read by middle and upper class gardeners.[[46]](#footnote-46) Without acknowledging that chemical aids were on offer at all, it is unclear from Wile's book how garden chemicals were viewed by her working class gardeners. Hoyles reports a 1956 study on the high efficiency of food production in small gardens of working class houses compared to dedicated farmland, but does not include comment on the use of chemical aids.[[47]](#footnote-47) Illuminating some of the class aspects behind the use or rejection of garden chemicals is part of what this thesis intends to achieve.

Class is entwined with income, enabling either to afford, or be allocated, a house with space to garden, as well as availability of income and time to spend on gardening, in fact Quest-Ritson asserts that gardening is all about money and class, either as an aid for survival for the poor or a symbol of prosperity for the rich.[[48]](#footnote-48) Hoyles gathered data on the importance placed on space for householders to garden, using the recommendations of the 1917 Tudor Walters Report and the 1949 Ministry of Health housing manual which both included gardens in their plans for post-war housing needs.[[49]](#footnote-49) Brown pointed out that although a post war Mass Observation report indicated that 80% wanted a garden, when it came down to gardening, this desire was better interpreted as space to do as one wished.[[50]](#footnote-50) Council house gardens are singled out by Jane Fearnley-Whittingstall for their level of neglect or alternative uses such as pram parks and car repair due to the tennents' lack of long-term tenure.[[51]](#footnote-51)

Allotments are another space for gardening, typically by people without the means to do so at home. I consider allotments an extension of domestic space, as although they are not necessarily located near the physical building treated as a home, an allotment user may feel at home, they care for the space there, and there is traffic of items between home and allotment. George MacKay documents the attention that allotments have received because of their contested status. He shows that landowners (usually councils or railways) who willingly rented the land for allotments, came to see allotments as untidy and undesirable when compared to the income that could be generated by selling them to building developers. Allotment holders campaigned to keep these urban green spaces as necessary for human welfare through physical work, companionship and fresh, cheap food (as growing food without using fossil fuels).[[52]](#footnote-52) Although growing produce on allotments can be viewed as a creative, caring, or even dutiful act of self-sufficiency, it can also be seen as 'a badge of poverty',[[53]](#footnote-53) an indicator of necessity rather than choice.

There has also been a relationship between men's unemployment and the charitable provision of allotments as well as tools and seeds, which although benefits his family is also unquestionably tied to provision of a meaningful occupation for the unemployed person.[[54]](#footnote-54) This type of provision can be looked at as one that precludes women as allotment holders, as they were generally not the job holders made redundant. Times of war also changed the profile of allotment workers, at least in terms of gender if not background of the holders, where women took on allotment duties when men were temporarily away fighting, or killed. On the return of peace, men returned to the allotment and even in the late 1960s, 96.8 % allotment holders were men.[[55]](#footnote-55)

Research on allotments has considered gender, most commonly the number of women visible working allotments, or the split of names on registers of allotment holders. From over 90% of allotment holders named as male in the 1930s, since the 1970s women have gradually dominated the allotment. This change has been framed in terms of concern for the environment and nurture of the family through food known to be safe, but has ignored more practical questions such as household dynamics and the process of registering for an allotment, as well as the availability of toilet facilities. Beyond the scope of the period studied in this thesis, Susan Buckingham researched allotment use in the late 1990s to early 2000s, with an eye on women's involvement in grass roots environmental campaigns, and noted that the increasing presence of women was changing how and what plants were grown, with women less likely to use chemicals on their plots than men.[[56]](#footnote-56) Although Buckingham did not research the 1980s, which would have been more relevant to this thesis, it relates to a theme of lower chemical use on allotments worked by women which Buchan identified in the 1940s,[[57]](#footnote-57) suggesting that what Buckingham noted was not unique to her time period and had been occurring much earlier. Perhaps this supports a difference between women's and men's attitudes towards the necessity or suitability of chemical use in food production that is more longstanding than the increasing awareness of environmental consequences of large scale agrochemical use generally pinned to the 1960s and 70s. This question is one that this thesis can address.

Another contributing reason for unequal gender representation on allotments could be the lack of toilet facilities which puts off women, an idea which Buckingham draws from the Thorpe report into the declining use of allotments in the 1960s.[[58]](#footnote-58) A 1984 comic poem to the Allotment and Leisure Gardener's journal detailed how the absence of toilets was more of an inconvenience for women than men.[[59]](#footnote-59) This factor may have contributed to the space being male dominated but as Buckingham points out, still very few allotments have these facilities now, yet allotments have continued to attract more women as users. In this thesis I will aim to contribute to the understanding the role of gender in garden chemical use through exploring representations found in the media of gardeners who use chemicals, and tracing attitudes of gardeners towards chemicals through oral histories, news and magazine sources.

Not only was the government interested in the space available to garden, they also advised on how, when and what to plant to make the most of the growing season while avoiding gluts, which included details of fertilising, composting and digging. The need to reduce reliance on imported food during and after the second world war, by efficiently growing food on a small scale at home or on allotments was the subject of Ministry of Agriculture 'Growmore' leaflets.[[60]](#footnote-60) Ginn dissects the production and impact of the Growmore advice, showing that the government's explicitly stated aim of controlling gardening habits was not met, with less than 10% of gardeners reportedly using the painstakingly produced plan as their main guide.[[61]](#footnote-61) Users and the acceptance or disregard for instructions given to them by experts is a topic that will be revisited repeatedly during this thesis.

Quest-Ritson locates the portrayal of gardening as a struggle against pests to the 1920s, following the first world war, its loss of manpower and a desire to control the environment where it could be done.[[62]](#footnote-62) This industrialisation of domestic food production was accompanied by support for the use of fertilisers and pesticides; small scale gardeners were expected to make full use of the range of chemicals available to maximise productivity, just as agriculturists were. Weeds and insect pests were likened to foreign enemies, they could damage domestic crops just as severely as food ships could be sunk, and were depicted in posters and exhibitions with Nazi imagery.[[63]](#footnote-63) Buchan outlined the development and popularisation of ready made compound fertilisers during the Second World War as a more dependable solution for novice gardeners than making up one's own fertilisers from simple chemicals.[[64]](#footnote-64) From Buchan's work it is hard to get an idea of how the users in her stories made decisions about and interacted with the different forms of chemical available to make their food production more bounteous, or to make the processes less tedious or more reliable, so I want to engage with this topic.

### Lawns

In a garden, as well as food production, another role that chemicals could be used for, is lawn treatment. Writing about the contemporary American lawn, Paul Robbins emphasises the role of lawn care in participation in neighbourhood conformity. He also describes the emergence of domestic lawn care as a profession in the late 1980s, which relieves the householders of the task of choosing, applying and storing herbicides, fungicides and fertilisers. To some extent, this could demonstrate that householders prefer not to handle the chemicals, an acknowledgement that the chemicals can be hazardous, or it could be a desire to avoid the work while having a uniformly green lawn that does not disgrace the neighbourhood. Alternatively, the delegation of this task to professionals means that agricultural strength chemicals can be used. *Does Robbins go into this any more? What does he actually argue?* The reduction in agricultural herbicides and pesticides seen in the 1970s is estimated to have been exceeded by the increased amount that is used domestically to perform this act of care, conformity to local social norms and therefore neighbourhood belonging.[[65]](#footnote-65) Although lawns feature in British gardens, street design has not resulted in the same type of manicured front lawn mentality. By contrast to the approach taken by Robbins to the American lawn, Tom Fort concentrates on the lawn mower as central to lawn care, with only the briefest, passing mentions of chemicals in his reflections on the British experience.[[66]](#footnote-66) The predominance of the mower should not be unexpected, as it is the chief means of keeping weeds in check for the average contemporary gardener who is not concerned with creating a pristine sward.

Gardening as leisure[[67]](#footnote-67) has been the focus of the limited amount of scholarship on the ordinary or everyday practice of gardening. Brown declares that by the 1950s 'work was out of fashion', at least when it came to gardening, citing the architect Brenda Colvin when saying that the ideal solution for gardeners was to have as little essential work as possible when designing houses and their gardens.[[68]](#footnote-68) Mark Bhatti and Andrew Church describe the complexities of gardens as a site of leisure and work, where men and women experience the garden differently through the gendered division of labour, and recognising the themes of control and order in the garden as coming through particularly evident in men's descriptions of their work in the garden.[[69]](#footnote-69) Women strongly related gardening to unpaid, indoor housework where there is always something to be done, but unlike housework it can be creative, has beautiful outputs they could leisurely enjoy and is not confining.[[70]](#footnote-70) The use of chemicals in the garden is not mentioned by Bhatti and Church but could be further explored through the idea of how, and who, control over the garden might be sought using chemicals.

Histories of mechanical technology can provide another way of looking at gardening practices. The lawnmower, its users and associated networks of consumer advocates, safety campaigners, legislators and manufacturing companies, provided Arwen Mohun with excellent material to explore the management of risk in the garden, with respect to this particular technology.[[71]](#footnote-71) This type of network analysis provides a comparison to the risks presented by chemicals used in the domestic environment.

### Chemicals in the garden (and on the allotment)

Researching the historiography on chemical use in the garden demands a roundabout route through looking at the use of chemical pesticides in agriculture. Smith and Secoy's review of weedkilling methods from Roman times to the 1830s, seems to focus on agricultural uses, although killing weeds on paths and walkways, which could be domestic, are also mentioned. Their aim was to push against the idea that chemical weed control is a modern phenomenon. They describe the use of amurca (the watery residue after extracting oil from olives), soot, hemlock and lupin juice sound as though the user could obtain these things from their own domestic activities. There is no indication that these were sold and distributed as a solution to weeds, and the study does not say where or how the simple manufactured chemicals such salts and copper sulphate were obtained.[[72]](#footnote-72) Scientists and historians have written about the development of hormone weed killing and rooting methods, which have later been presented for domestic use. However, while the transition from laboratory curiosity to agricultural application has been studied, the shift from agricultural use to domestic applications has tended to escape the focus of scholars.

Studies of the non-use of chemicals, tend to position gardening according to organic methods as radical, environmentally aware and a fringe or minority activity. Histories of organic gardening in Britain are vague about the prevalence of chemical use, with statements such as 'throughout the 1960s persistent chemicals were used in a cavalier fashion'[[73]](#footnote-73) which are left unexamined and we learn nothing more about the users, what they knew or why or how they chose to use chemicals in their home gardens. Increasing membership of organisations such as the Henry Doubleday Foundation or the Soil Association indicates rising interest in organic methods, but only really show up the most concerned joiners rather than those who may not use chemical methods but are not sufficiently motivated to become part of organisations like these. The act of gardening can be one closely linked to conservation and ecology, described by Frefogle as 'To tend a garden well, fostering its beauty is to enact on a small scale what humanity needs to do on the earth generally.'[[74]](#footnote-74)

Motivations for organic gardening methods are often health oriented, or out of concern for wider ecosystems, disillusionment with chemical methods as pest resistance emerged or soil quality deteriorated, not to mention distaste for the notions that gardens could become another place where people were trapped in escalating consumption of manufactured products.[[75]](#footnote-75) In organic ideology, the total rejection of industrially manufactured chemicals is held as the only way gardening organically, ignoring the users who pick and mix the application of ready-made garden chemical aids with organic methods such as composting according to their own situation and needs. Choosing not to pay for chemical aids, not out of ideological reasons, but for frugality is overlooked, which sets this practice apart from the modern crop of books of household tips promoting bicarbonate of soda for most household cleaning jobs where thrift is stated as a principle reason for these practices.[[76]](#footnote-76) The users who choose to combine chemical and organic methods are not considered by those writing about organic methods. In this thesis I hope to show domestic chemical users as more complex than they have previously been portrayed, that it is not a choice between two polar opposites, and that it is one that can change over time as the needs of the garden and the gardener shift.

### Insecticides

The development and use of domestic pesticides has not been well studied, even where equivalents have been used on an industrial scale, such as DDT. Charles Quest-Ritson links the demand for chemicals by gardeners, DDT in particular, to newspaper publicity for them and credits the Royal Horticultural Society with warning that the publicity was 'premature' before investigations about wider effects on non-target species were known.[[77]](#footnote-77) It is interesting to see the framing of demand created by newspaper, as if the consumers were not having their own independent thoughts about the subject. Reviews on the use of domestic insecticides are limited to contemporary usage studies and effects on human health,[[78]](#footnote-78) [[79]](#footnote-79) rather than long-view, historical development, or in-depth user research. In addition, these reviews are carried out by researchers in the USA, looking at American homes. Although some of the same products are available in the UK, this country has been subject to different regulations as well as different populations and prevalences of pests which affect the regularity of domestic pesticide use.

DDT has attracted most attention for its widespread use on farms as well as in homes, and its position in the ecosystem as a persistent, bioaccumulating chemical. Rachel Carson's book *Silent Spring* is hailed as calling attention to the consequences of using indiscriminate chemical control, although as Gunter and Harris point out, concerns about the use of DDT on wildlife in the USA as well as resistance to the chemical had been publicly raised long before Carson championed it.[[80]](#footnote-80) Mark Wilson also showed that the question of unwanted effects of agricultural pesticides on British wildlife was in the press and discussed in parliament before Silent Spring brought the issue to even wider consciousness.[[81]](#footnote-81)

Even so, the incorporation of DDT into everyday household chemical products, as opposed to applied specifically for malaria control, has, surprisingly, not been well examined. Where DDT is reflected upon, it is from the superficial position of horror that it was allowed, or resignation that at the time the consequences of persistence were unknown. DDT is discussed here because despite of its emotive effects in the ecosystem, I find it peculiar that there is no scholarship on the range of domestic products, or the contemporary reaction to them. DDT was welcomed and invited into peoples houses, including British homes. For this reason, it will form a small part of my thesis in order to make comparisons with other chemicals.

What has instead appealed to writers is unwitting or no-choice exposure to the pesticides in the form of residues on produce, or from drift, so this is the principal way that these agricultural chemicals are seen to enter, uninvited, into the domestic environment. An example by James Watson looks at the tragic effect of the weedkiller sodium chlorate brought inadvertently from the agricultural fields where it was applied, back to a domestic setting where it could cause fires, but not at any deliberate uses of the chemical at home.[[82]](#footnote-82) Sodium chlorate is one of my choices for inclusion in a case study because of its transition from agricultural use to domestic use, and because it seems to have always retained its chemical identity even when it has appeared in a branded form. It can be considered a forerunner of another of my herbicide case studies, paraquat. At the time of writing, both are currently banned in Britain, chlorate for its use as an ingredient in explosives while paraquat's toxicity means it can no longer be used in the EU.

Summary

Competition between weeds and food crops, whether grown at home for economic or health reasons has stimulated some interest in writing about gardening and its relationship to chemicals. Controlling weeds for aesthetic purposes has not been investigated. A false dichotomy, or polarisation of views on the use of chemicals in the garden has been set up by those who completely reject mass-manufactured chemicals on ideological grounds. The protection of agricultural users in third world countries, and of the wider natural environment, are the most important foci for those writing about chemical use. This demonstrates a vacancy for work shedding light on the views and practices of non-activist, and mixed method gardeners.

## Photographic Chemicals

Histories of photography that are include comment on chemicals tend to concentrate on the earliest periods of photography, with no word on how the pioneers came to acquire the chemicals they used, whether they had been readily available or hard won through networks of contacts. While the early history of photography is certainly very chemically orientated, the profile of chemistry drops rapidly in favour of discussion of the content, composition, aesthetic and artistic merit of photographs, along with the social and political roles of photography. Darkroom work and the use of photographic chemicals, despite often being part of the creative process is most often overlook and not examined in detail by historians. David Edgerton wrote about Britain's photographic chemical industry but did so without reference to the people who would use the products developed, so we are unable to see how their experiences and needs influenced the firms' research and development processes.[[83]](#footnote-83)

# Product development

The question of how a company goes about deciding what to make is an important, though complex one. Edgerton tied the pursuit of certain photographic technologies by firms to individuals who were experienced in those areas, using the example of Frances Hamer and the transfer of her expertise in the chemistry of sensitising dyes to Ilford from her previous employer.[[84]](#footnote-84) This theme is mirrored in Roy Church and Christine Clark's research on Reckitt's. The development of Dettol disinfectant relied on Dr Reynold's expertise which he brought to the company after leaving Jeyes, having his formula rejected by that disinfectant manufacturer.[[85]](#footnote-85) These skilled personnel can be described as the part of company's resources and competencies, in combination with existing machinery, personal contacts and distribution networks that the company has at their disposal. Considered together, these act as the drivers behind the diversification or extension of product lines.

Church and Clark's research on Reckitt's showed there was specific instruction from the Board of Directors to find new uses for existing products, which could then be repackaged. This was not a fruitful strategy for Reckitt's. Church and Clark made an example of Windolene, which was found to be very effective at cleaning enamel stovetops as well as windows. However, following the advice of retail staff who questioned its competitiveness against established brands such as Kleenoff, Reckitt's did not pursue this repackaging. Interestingly, Church and Clark did not discuss another option open to the company, that of promoting these other cleaning uses without rebranding the product. Instead of widening the perceived utility of this household product, they held onto the specialist application which they had committed to with the name of the product.

Whereas Edgerton's study did not indicate whether or how Ilford considered the potential users of their products, Church and Clark revealed that Reckitt's certainly were concerned with consumers in relation to new products. Reckitt's observed shopper behaviour and preferences in stores, but they also gathered information on their likely users by asking retail staff, rather than consumers, for their opinion on whether a proposed product would appeal. Retailers are also prospective consumers, perhaps even expert ones who are exposed to different products and have the opportunity to try them out, then impart their knowledge to their customers. However, these methods did not generate good leads for developing new lines, but Reckitt's attention to the differences between selling through chemists and grocers, and to the general state of the market for various products directed their investigations more successfully into new products. Reckitt's identified a gap in the market for a disinfectant that could be sold in grocers shops, who were already distributing Reckitt's products, as cresol and carbolic acid based products were restricted to chemists. This made use of their existing distribution networks, and would offer consumers a useful, effective product while they were shopping for other household supplies, which conveniently saved them from going to the chemist.

The decision to go down this product route was bolstered by Dr Reynolds transferring his expertise with bactericides to the company. They turned to the London Press Exchange, which was comparable to a large advertising agency but formed of subsidiary companies specialising in market research, design and packaging, to help them better understand the market and fine tune how they presented their product. This choice to seek advice from outside the company could be linked to an increasingly complicated market place, with more competition from other branded goods and diversification of durable household technologies leading to shifts in consumer needs.

Reckitt's consciously developed products that were functionally and chemically similar to others already on the market, with a proven demand. They did not create novel, standalone products that they had to create a market for. Dettol was novel in that it was quite different to its competitors because of its pleasant smell, its effectiveness at killing germs and where it could be sold, but the market was highly receptive to the arrival of such a product. there was an Reckitt's reacted to consumers' changing tastes for kitchen appliances made using materials that did not require their black lead polishes, and diversified into polishes that could be used on other household surfaces. In the 1920s Reckitt's enhanced sales for metal polish through promotions that saw consumers buy brass trinkets and generally fostering the fashion for ornamental brassware that required their metal polish.[[86]](#footnote-86)

Returning to the idea of existing machinery and expertise, Celia Kirby suggests that these can shape the approach taken to the form of new products. In her examination of hormonal weedkillers, she cites both manufacturing company ICI's and the farmers' experience with fertiliser "dusts" and the technologies to produce or apply it as the reason for their new MCPA herbicide being formulated as a dust in the 1940s. Although she did not further investigate the relationship between large scale, agricultural and domestic, or small scale users, Kirby gave a contrasting example of the development of a 2,4-D herbicide preparation by Boots, where the volume required by a domestic user was so small, that for even lawn coverage a liquid formulation was considered the only sensible option, as the gardener would be more familiar with evenly watering on a diluted solution, than sprinkling on a dust.[[87]](#footnote-87) This demonstrates that companies understand what their users are likely or unlikely to want to do and why, for instance, be unwilling to buy new equipment, or wary of trying to evenly distribute a tiny amount of active ingredient over a lawn that they have worked hard to make.

Reckitt's had done small scale, in-house consumer testing but this was replaced in 1938 in favour of a Housewives' Jury, which would have been more impartial than employees from the company. However, despite this acknowledgement of the potential perils of asking interested associates, it was not easy to escape, as market research provided to Reckitt's by advertising agency J Walter Thomson may also have been (at least partly) drawn from agency employees. The involvement of employees shows that user experiences were considered important, and the availability of salaried staff would have enabled reliable follow up or long term usage studies. An underlying desire to please might not necessarily have meant an overemphasis of benefits, it could have resulted in employees delivering a stricter evaluation with the aim of getting a product to be truly proud of. However, the absence of reflection on the process from the perspective on employees who tested these products out at home, makes this practice hard to comment on.

I wonder if Boots employees may have tested out toiletry products at work, as at the factories the workers were provided with hot baths, towels and soaps. As manufacturer of toiletries, it would be a useful pool to gather feedback from.

# Consent to exposure

A theme which I identify as 'consent to exposure' can be seen in key works on chemicals found in the home. Lead paints and pipes, or arsenic in wallpaper demonstrate that chemicals detrimental to health when in domestic environments, despite having the qualities that made them attractive for those uses such as bright, vibrant colours, or lead pipings' durability. The downsides only came to light after experience of living with the chemical. Werner Troesken points out that the dangers of lead piping for water was known in Ancient Greece by Galen, and Vitruvius, yet appeared to be forgotten.[[88]](#footnote-88) Awareness of lead is shown in Mrs Beeton's Book of Household Management (1861) through the statement that "A newly-painted house, too, often affects those living in it."

Janet Ore showed that industrial and consumer optimism about new methods and adhesives that were used in the 1950s to make large quantities of plywood very economically was tarnished by the unforeseen, detrimental health effects which followed living with the products. The consumers had willingly chosen this new material thanks to its price, convenience and aesthetics, but had not expected that there would be such negative consequences from their furnishings offgassing.[[89]](#footnote-89) Michelle Murphy's examination of sick building syndrome in the 1980s and 1990s, again looked at the rediscovered consequences of new, synthetic furnishings in enclosed spaces. This time it was combined with construction experts who aimed to control the environment through insulation and ventilation, which is what those commissioning or using the building had wanted, but who facilitated the build up of, and exposure to, noxious chemicals, something that was unwanted, but unforeseen by the users.[[90]](#footnote-90)

In these examples, the consumers are portrayed as unwitting victims who chose modern, affordable, readily available products and trusted the manufacturers to provide them with goods that were safe; they did not expect or consent to the release of chemicals from these products into their homes. The chemicals studied in this thesis were chosen specifically rather than as an uninvited accompaniment to the primary object of desire, but the similarity is in the expectation that the chemicals had been proven to be safe.

Another aspect of chemicals entering the domestic sphere without consent is though the fluoridation of water, which started in 1945 in the USA and in the 1950s in Britain. It was hailed as a magic bullet to prevent tooth decay but condemned by some as unnecessary mass medication.[[91]](#footnote-91) Suspicions of those who feared it were ridiculed in the 1964 film Dr Strangelove, though the character Jack D. Ripper who believed that the Russians' strength was due to their lack of fluoride, the purity of their water (and vodka).[[92]](#footnote-92)

Although fluoridated water could be said to be adulterated, this is not done to deceive consumers, as for instance in the cases of bread, or beer, but to benefit them. Despite fluoride not being actively welcomed by all, it is hard for consumers of tap water to avoid. The mass adulteration of consumer products is still a concern, for instance in the market for counterfeit alcohol. The responsibility to avoid dangerous counterfeit goods is placed on consumers, who have been advised to look carefully at the labelling, which may very closely resemble trusted brands, for spelling mistakes and other discrepancies and to consider whether the price really is too good to be true. Profit can be made on boosting ethanol in low quality alcoholic spirits with cleaning fluids, screen wash, nail varnish remover (acetone), methanol or isopropanol. The quantities used may be nearing industrial, but these additives remain household chemicals. Not only are there revenue losses from unpaid duty, but there are serious health consequences associated with drinking substances known to be unfit for human consumption.

Human health is central to all these investigations, as is the concept of providing information in order that those substances and feared effects can be avoided.

# Accident prevention

The relationship between preventing unintentional acute injuries by household chemicals and regulatory policies has strong parallels with the pharmaceutical industry, indeed this is where examples most often come from, but has been comparatively neglected, with much taken for granted or assumed.

The Royal Society for the Prevention of Accidents (RoSPA) was formed in 1916 and established a Home Safety division in 1931 to complement their work on industrial safety. While Hugh Jackson described RoSPA's 'main thrust' as education in road and home safety, it is hard to find lasting material evidence of their work relating to chemicals in the home, compared to the promotional items and public fondness for the long lasting and popular Tufty Club to educate children on road safety. RoSPA's 1960 and 1986 poisoning prevention campaigns were mentioned in national news coverage, but no subsequent news stories of unintentional poisoning referred back to the organisation, suggesting that they did not seek to sustain a visible media profile by offering spokespeople for comment.

Children are understood to be at particular risk from accidents, due to their lack of experience in the world.

However, just as designs that facilitate accessibility to museum exhibitions, public spaces or even websites, measures that benefit the previously disadvantaged group also benefit other people, the true should be the same that when children are considered to require safety measures, those measures make the experience of chemicals at home safer, or at least not more dangerous, for everyone.

# Industry and Domesticity

Farming is an interesting hybrid of home and industry, with authors who write on farm safety often failing to do justice to the tension of the demands of the farm as a place of work and a domestic place. While chemical hazards had been identified as relevant to workers, the requirement to have separate clothes was purely framed in terms of individual worker protection, rather than protecting the other people who may come into contact with the worker, their family. The principal hazards to children who lived on farms were deemed to be injuries from tools or machines, and drowning in ponds or tanks.[[93]](#footnote-93) Despite historian James Watson's inclusion of an account of a fatal domestic fire started by the sodium chlorate in a farmworkers clothes as the result of not using protective clothing, Watson did not comment further on the boundaries between home and farm.[[94]](#footnote-94) The case of workers who handled asbestos and who's families were thus exposed through their work clothes worn and laundered at home have been more thoroughly examined, … The availability of chemicals on the farm which could also be used as domestically, for instance keeping domestic gardens weed free using agricultural herbicide, is not addressed, and a blind eye apparently turned to workers who do not live on the farm but abstract amounts to use at home with this practice appearing only as the subject of . The storage of chemicals could be associated with availability for misuse,

Child centred society

# Science in culture

Science in culture studies the place of science and scientists in everyday, popular culture, such as general appearance of science stories, or scientific industry coverage in newspapers or radio, science fiction films. It differs from investigations of public understanding of science, which are concerned with the popularisation of institutionalised scientific research in order to gain support for continued public funding.

William Reader describes that entering the chemical industry was considered a poor alternative to the professions and detailed the attempts made by ICI to raise the profile of working in industry through approaching public schools directly.[[95]](#footnote-95) The number of advertisements that ICI placed in The Times directly addressing and re-educating this upper class segment, suggests that the new company were very keen to position themselves as the prominent face of the entire chemical industry. They offered brochures explaining the role of the chemical industry, showcased industry fairs, highlighted economic contributions, as well as the history of chemistry and significance of chemistry in everyday life. This focus on acceptability of the industry, along with the useful, beneficial products it generated, possibly also shines light on the need to rehabilitate chemists and chemistry following the use of poison gases in the Great War.

Mark Griep and Marjorie Mikasen make the case that chemicals make good subjects for film makers, because of the power that they, and the chemists in charge of them, can hold to either be destructive, or protective. They categorised chemical themes in movies as "dark-side" (Jekyll and Hyde effects, invisible man, chemical weapons, bad companies, addiction) and found that these were most often found in the genres of thrillers, science fiction and horror. What they termed "brightside" movies were rich in biography, mystery and romance (inventors, forensics, in the classroom, good researchers, drug discovery).[[96]](#footnote-96) This shows that no matter what genre film is preferred, it is possible that chemicals and chemists can feature in them, meaning that people are likely to have seen a film portrayal of chemicals. As movies can have great impacts on their audiences, they should be considered in this thesis as a possible influence on how people view chemicals. Of particular interest, because of its connection with household chemicals, rather than laboratory chemistry, is the *Incredible Shrinking Woman*, which riffs on the *Incredible Shrinking Man* of 1957. This film is not included in Griep and Mikasen's book, which focuses on more sucessful and serious movies, but due to the frequency that the *Incredible Shrinking Woman* was shown on British television in the 1980s (and the impact it had on me as a child), I choose to investigate it more thoroughly.

### Chemophobia

Despite efforts to engage people outside the varied world of the chemical industry, suspicion towards synthetic chemistry has been a serious concern of chemists, of educationalists recruiting students to chemistry, of product development scientists and of advertisers. I dispute the assertion that "the 90's generation is the first of mankind to have become afflicted with chemophobia"[[97]](#footnote-97) as chemophobia was already considered a problem in 1964 when the term was used by Edson, director of the chemical firm Fisons, in the Horizon television programme Pesticides or Posterity.[[98]](#footnote-98) Researchers who placed chemophobia firmly in the 1980s tactically did so to support the agendas behind PUS, when the problem had been acknowledged long before then. The idea that the word chemical had been 'hijacked' by non-chemists is how John Emsley describes 'chemiphobia'. Another hijacking of a chemical word 'organic' and its application to farming and gardening practices did not help matters between pedantic chemists and non-chemists.[[99]](#footnote-99)

The attitude of chemists toward non-chemists who they deem to be afflicted with this phobia is unfortunate, impatient, arrogant and that it can be fixed through education. Many phobias can be treated through education, but the material produced by chemists for this end tend to be condescending and irritating. Hugh Crone's *Guide to the New Chemical Age* typifies the PUS approach of non-scientists as empty vessels to be filled with knowledge, going as far as suggesting enrolment in a college chemistry course, as well as talking condescendingly and at length about his specialist subject, personal protective equipment and its use in industry (impractical and irrelevant for the domestic user of chemicals), while peppering the narrative with supposedly reassuring tables of data and half-remembered anecdotes.[[100]](#footnote-100) John Timbrell, likewise a chemist seeking to tackle chemophobic non-chemists, misspelt and confused professional and amateur paraquat products in his book on poisons, and muddied the waters for any readers trying to understand the situation.[[101]](#footnote-101)

John Emsley writing about the chemicals encountered in everyday life, including household chemicals, is another chemist who has adopted the mission of enlightening non-chemists. He similarly insists that everyone should 'know a little chemistry' and defends chemicals by directing attention (or blame) to the user with phrases such as 'the real culprit is not bleach, which has saved millions of lives in its time but ignorance'[[102]](#footnote-102) and 'often a behaviour is more dangerous than the chemical'.[[103]](#footnote-103) These statements are true but if the desired result of reading these books is an informed, confident consumer, delivering overwhelming amounts of technical information, served with an attitude of scolding condescension is unlikely to generate the anticipated outcome.

Chemophobia implies irrationality, a phobia being irrational, which does consumers who would prefer to avoid certain chemicals because of their connections to health or environmental a disservice. A lack of understanding about the minute quantities of residue that can be detected by high powered equipment is blamed, and nonsense comparisons are made for the sake translation to everyday terms. Declaring that a person would have to eat '300 cups of treated grass clippings' to match the toxicity of one cup of coffee misunderstands and simplifies the consumer's worries. This does not answer anything that the consumer has asked, their fears about toxicity have been contorted in order to provide a pacifying, nonsense statement. Nobody would eat that much grass clippings, but they and their pets do walk on the grass whether barefoot or in shoes and transfer whatever residue into their home and car. Although the quantities of any one chemical may well be tiny, entire lives are lived among an ever changing mixture of them, which makes mixtures extremely hard to study. carrying around puzzlement and guilt that their choices had unforetold consequences.

Concern about mixtures of chemicals experienced in everyday life has been expressed in popular culture, such as books and films, since the 1950s. The protagonist of the Incredible Shrinking Man recalls being caught in the spray of by a pesticide by a company treating something in the street, then some time later is exposed to a mysterious shower, which might be nuclear fallout from a test explosion. Neither is clearly linked to the man's condition, but they are the suspected culprits. The story was later retold in the 1980s, not to any critical acclaim, but after its cinema release Incredible Shrinking Woman was a staple of the late night and early morning films on television. The effects cannot be pinned to any precise exposures although we see an instance involving an air freshener and a perfume, but here the medical professionals, rather than the shrinking woman, point to the complex mixture of consumer products that the woman is surrounded by everyday, compounded by her husband's role as advertising jingle writer who brings home new products in development. The Incredible Shrinking Man has a terrible sense of isolation and ends quite bleakly, but in the new version, while the same problems between husband and wife and daily life are played out, the woman's situation is championed by her neighbour who campaigns outside a large supermarket to raise awareness of the unknown mixtures concocted by consumers. Initially firmly categorised as science-fiction in the 1950s, the Incredible Shrinking Woman is not. It is described as a comedy, with cultural comment.

While I am not saying that these fictions would have caused anyone to change their domestic behaviours, their creation reflects some of the public concerns about uncertainties associated with the use of chemicals. They may not have been as commonplace or as visible as now, but do suspect that they reached more people and therefore did more to provoke thought or discussion about the chemicals experienced in everyday life than the books written by chemists to demystify or reassure.

Additionally, these books may be written and available, but it appears that they do not reach beyond niche audiences who are already interested in everyday science, probably does not get to the audience who could most benefit by the reassurance that they try to offer.[[104]](#footnote-104) For instance New Scientist carried a review as did Science Education Review. Initiatives that target mass media such as the aim to improve coverage and accuracy of chemical stories in the news media by the organisation Sense About Science, potentially spread a positive message about chemicals simply by exposure to more people. Sense About Science operate a service that helps journalists get in touch with scientists who can provide balanced comment, but what SAS appear to miss is that main stream journalists do not always want accuracy, they want punchy attention-grabbing statements.

What chemist-authors like these do not address, are the perspectives of the users. They appear to have forgotten what it is like to not know the intricacies of chemistry, and do a disservice to the ability of people to tone down the hyperbole of mass media news. These authors do not consider the human and environmental variables. Chemicals contained in glassware are one thing, but the effect of chemicals out in the rest of the world, on living systems is another. People complicate chemistry by operating within institutions and simply being human: corruptible, deceptive, and often wrong, so distrust of chemistry is not simply about the chemicals but about the human factors that mediate these products entering the market. Edson tried to address this in his television speech about pesticides when he lamented that 'chemophobia leads everyone to suspect that the sprayers and the chemists who devise or use these chemicals are careless, uneducated, negligent or even wilful poisoners...It is difficult to persuade people that the people who make or use these chemicals aren’t wilful poisoners, they’re clever, conscientious, selective poisoners in the service of mankind.' He lamented that 'Nobody loves a poisoner, no matter how you redefine the term.'[[105]](#footnote-105) The issue of poisoning is one that shall be returned to throughout this project.

In their exploration of the public profile of chemistry, Bernadette Bensaude-Vincent and Jonathan Simon excuse the targeting of chemistry as logical, that when the chemical industry is associated with material consumption, increased choice and industrial expansion, the political movements who criticise consumer culture identify these properties in the chemical industry.[[106]](#footnote-106) However, I would question whether those targeting chemistry are indeed critical of wider consumer cultures. I think that Bensaude-Vincent and Simon get closer to the motivation for negativity towards chemicals and chemical industry in their discussion of Rachel Carson's *Silent Spring*, when they describe how the public have learned fear and distrust from past experiences in which chemists projected an image that they were in total control of the situation when they really appeared to have remained ignorant of the wider consequences of manufacturing and using a product.[[107]](#footnote-107)

By researching the use of household chemicals, a better understanding of how the public engage with chemistry will be reached. A vocal minority may stand out as deeply concerned about the ubiquity of synthetic chemicals, but revealing what the willing users of chemicals did in their homes, will flesh out the one dimensional story presented by the fact that products were purchased.

# Methodology

By heeding Ann Smart Martin's call for research that combines and contrasts different kinds of evidence in order to understand the people who consume, rather than only as consumers[[108]](#footnote-108) I draw on diverse documentary and material sources to try to uncover motivations and constraints that acted together to create a changing domestic landscape of chemical use.

### Sources: Chemistry exhibitions

As a student doing a Collaborative Doctoral Award in conjunction with the Science Museum, museum collections and exhibitions are a key component of my research. One of the places to project an image of chemistry is at an exhibition, either in a museum or a public celebration of technological developments such as the Festival of Britain, or a single themed event.

Introduce with more general science exhibitions/museums – mission statements etc, popularisation, then go into chemistry. Can distinguish from nuclear education missions (eg Atoms for Peace train) and penicillin (ask Viviane). Will be something included in oral history.

Fairs like “Chemistry at Your Service” and the Festival of Britain were high profile events which celebrated pure and applied science. However, little comment has been made on Chemistry at Your Service, while the assessments and reminiscences of the Festival of Britain, including the Kensington and South Bank Discovery Dome displays, tend to focus on the practicalities and personalities involved in putting the festival together and the lasting impression on visitors of architecture, design and planning, leaving the impact of the science content under-evaluated.[[109]](#footnote-109)

Morris examined how chemistry has been presented to visitors of the Science Museum, London, which has been predominantly about laboratories, either academic or industrial, and being a technology museum, the equipment involved in manufacturing, experimenting and quality control.[[110]](#footnote-110) The concept of chemistry is conveyed as a scientific practice, distanced from the everyday uses of chemistry and chemicals. Chemicals that might be found at home are displayed in museums of science and technology, such as the *Making of the Modern World* gallery at the Science Museum, but unless their discovery, manufacture and function are elevated to dramatic, life changing narratives (pharmaceuticals and dyes for instance), chemicals tend to receive very little attention. Chemicals as a technology is another idea that is not explicitly explored. At Catalyst science centre in Widnes, which focuses on the chemical industry located in that area and illuminates some of the chemical technologies used in the industrial processes behind consumer products, but not that the visitor might experience in their own homes.

The *Secret Life of Home* gallery is again concerned with the design and workings of mechanical technologies, rather than the knowledge, practices or products required to care for them, such as cleaning.

It could be said that ordinary household chemicals lack visibility in museums, historic houses and reconstructions, when they are not associated with 'firsts', breakthroughs or some other significant event. The durability and attractiveness of pharmaceutical jars can lead to this type of object being preferentially collected, when compared to the throwaway packaging of everyday consumables.

The consumer chemicals presented at the Museum of Brands are presented in room or pantry style displays, or as series showing changes in packaging for one particular product. Museums that explore domestic life also present consumer chemicals, both in the context that they were sold and in where they might be stored or used in the British home. Sometimes, the presence of a producer of a chemical commodity means that a museum local to them will collect representative items, such as the prevalence of Chapman photographic materials or Imperial Leather personal care and grooming products at MOSI, in Manchester. Sometimes there will be a conspicuous absence, as in Nottingham’s Brewhouse Yard where the focus is decidedly turned away from Boot’s. Minerals in consumer products are displayed in the Museum of Natural History's Earth gallery. Shop displays at the Museum of Nottingham Life at Brewhouse Yard, and the Museum of Norwich (formerly the Bridewell Museum), demonstrate the increasingly unfamiliar counter service of chemical products. Chemistry sets, as toys for children are again displayed at museums such as the Science Museum or the Children's Museum but with little development or explanation of their interpretation that the chemicals contained within older, extensive sets, were 'dangerous'.

This sense of chemicals as dangerous shapes how museums collect chemicals. The lack of access to affordable, reliable specialist expertise or analytical equipment means that where interesting collections of chemicals are offered in old bottles and jars, perhaps without labels, imbues the chemicals with hazards that a non-expert would not be comfortable in handling. Most museums collect packaging and dispose of contents, or even avoid collecting objects to obviate the difficulty of disposing or keeping these on site, with their potential to be harmful if incorrectly handled, to react in unexpected ways or to off-gas in display cases, and affect other objects. University museums, with the specialist support of academics in the same institution, are more likely to keep laboratory and experimental chemicals.

A relatively rare and accessible story behind collecting chemicals for a museum display comes from historically minded pharmacist John Newstead. Aware of the speed of modernisation and loss of independent pharmacies in East Anglia in the 1970s, he visited stores that were closing or refitting. His expertise meant that he was confident when faced with stored chemicals and able to recognise hazards then behave appropriately. Newstead was given or bought all the items that eventually made up the composite display of a fictional pharmacist’s shop built initially for a private museum in his back garden, only open to invited visitors then later transferred to public display at the Bridewell Museum. Some thirty years after establishing the collection, Newstead published an unusually insightful and honest account of the rationale behind the display; collections policies and the patchy notes telling these tales are filed away in accession records as they are generally not what museum visitors expect to see.

Newstead explained that although photography was often an important component of a pharmacists’ livelihood, when he was collecting he had to adhere to a strict budget and as photographic materials were not “strictly pharmaceutical” he could not buy them and instead encouraged photography specialists to purchase them. This collecting policy meant that photographic chemicals and services are absent in the reconstruction. The notion of chance comes through strongly in Newstead’s descriptions of shop clearances, dustbins brimming with smashed glass bottles, structurally unsafe and therefore unexplored spaces that may have contained unknown treasures and containers of volatile substances that exploded in storage.[[111]](#footnote-111) Newstead’s refreshingly personal account encapsulates the challenges associated with gathering evidence of everyday interactions with chemicals and is not only relevant to the field of pharmacy. Although visitors might want to impose a neater, more ordered story on what appears to be a whole preserved shop transplanted to the museum, in truth this *is* how museums acquire and assemble objects for public consumption.

Newstead recollected how he had to decide how to deal with potentially unsafe chemicals. He could either not take the item, leaving it instead for someone else to deal with. If it was contained within a lot he was given, the problem was forced on him. The vegetable garden was the recipient of one particular disposal in the absence of a council-run service for such substances. Newstead chose to slice up white phosphorus and allow it to burn on the soil surface instead of risking accidental ignition in storage or on display, resulting in “a bumper crop of potatoes” rather than a catastrophe.[[112]](#footnote-112) It is not likely that phosphorus in this form would have ordinarily been sold and used in this way as a fertiliser, but it was a creative use from this gardener with chemical understanding, seeking to organise his nascent pharmacy museum.

Newstead hints at other chemicals used in the garden, in particular insecticides such as nicotine, among the “very nasty things I discovered which I wished I had not” as he searched through attics, sheds and cellars. Accordingly, garden chemicals are hard to spot among all the packaged, branded products in the shop reconstruction, although products specifically for treating animals are prominently displayed with the explanation that they were required by rural customers.

Garden chemicals (even if only the packaging) are missing even from specialised collections held by the Garden Museum or the Museum of Rural Life. The same relish or desire for completeness, that appears to inspire collections of packaging for food and other household products is simply not seen in relation to garden chemicals. Unlike goods used or consumed by the whole household, such as chocolates or washing detergents, garden chemicals tend to be used relatively scarcely, through well spaced applications rather than daily or weekly, and are only used by particular household members. As such, they would not be expected to elicit the nostalgia associated with food or laundry products. Unlike the endless ranks of domesticated medical equipment, boxes and bottles to kill plants and insects do not evoke morbid curiosity or visceral responses of the “they put that where?!” variety. Additionally, their status as killers has meant that they are even more likely to be thrown away when no longer needed, or as attitudes to work in the garden changed. Their low visibility in museums can be seen to match their profile in the home, items that were not prominently displayed but kept, as the instructions advised, out of reach in the shed.

### Sources: household manuals

Other than Dena Attar's bibliography of household manuals, which takes the outbreak of the First World War and the influence of the suffrage movement as the delimiting point, I have been unable to locate other historical studies that use home management manuals as their basis. As household manuals provide evidence that certain chemicals were recommended for use, or were known as poisons, then they could form a useful resource with which to trace availability of that chemical and advice on its appropriate storage and use. Attar enthusiastically promotes household manuals as sources, saying that it is "hard to overestimate [their] role in promoting the ideal pattern of middle class life" but also warns against forgetting that these sources prescribed, rather than portrayed them.[[113]](#footnote-113)

In light of this, I will review the content of a sample of manuals that were published during the timeframe of this thesis specifically to find information about using chemicals for household tasks. No doubt a significant quantity of information was reused between books and remained unchanged from the period that Attar reviewed, but I looked for changes in the presentation of chemicals as potentially dangerous, whether there were any special remarks on how readily it could be obtained, and any branding information.

The stains and textiles listed in the manuals provides windows to the era that the book was written in, showing changes in activities, foods and drinks that might be eaten, as well as the changing variety of stain removing chemicals. This makes the subject ripe for study in the sense of making use of chemicals for spot cleaning and stain removal. The case study of carbon tetrachloride is an opportunity to look at the issues of users and chemical safety, branding and packaging.

### Sources: newspapers

Newspapers are deliver information about, and therefore help to shape attitudes towards, chemicals and the chemical industry. Bingham stresses that newspapers have been underused by historians of the twentieth century, and points out that where they have been used, elite newspapers such as The Times have stood in for newspapers in general.[[114]](#footnote-114) One of the key places that chemicals feature in newspapers, along with stories of scientific progress, medical treatment and catastrophic accidents, is in the reporting of crime. Poisoning, acid attacks and explosions all involve chemicals, victims and perpetrators, and inherently carry human interest making them are newsworthy. Tunstall highlights that in 1968 crime reporting was classified as having an audience or circulation goal by the papers, and accordingly crime journalism grew. In concert with this, pressure groups and the police developed their public relations efforts in order that their messages were picked up more successfully by the reporters.[[115]](#footnote-115) Note that Tunstall does not include chemical companies or scientists in his list. They do not seem to have been motivated by the negative portrayal of chemicals to try to redress the balance, and in neglecting this opportunity to foster a relationship with reporters by positioning themselves as experts available for comment, contributed to the newspapers conveying a sense of chemophobia, through the continual association of chemicals with harm.

There are methodological shortcuts for the historian, such as using digital newspaper resources which can be searched for keywords. This can drastically speed up searches, but can also contribute to those papers with readily accessible electronic copies forming the bulk of the material, *The Times* is one such paper that most universities have access to, whereas the same facility for lower class dailies such as the *Mail*, *Express* and *Mirror* are possibly available on free trial or only at certain libraries. The loss of context is also keenly felt, especially when the physical organisation of the newspaper is ignored, such as the use of supplements which newspaper readers could remove and never glance at, or neglecting to check where the item appeared in the overall paper. The impressive numerical lists of hits for a keyword, which can be seductively graphed to show support for a thesis, can distort the true use of the word or phrase when not full explained.

Product and company advertisements placed in periodicals form a large part of the material for this thesis. However, awareness of the role of advertising revenue and the power relationships between the advertiser and the publication is necessary, if hard to establish. During the period under study, paper rationing during and following the second world war meant that the space available for placing adverts, not to mention news stories, was curtailed.[[116]](#footnote-116)

Tunstall describes the advertisements in lower tabloid papers are 'look-at' material, with pictures and big headlines, similar to the short, quick to read articles that form the rest of the paper. For tabloids, most income is generated through sales through their large readership, so advertisements form a lower percentage of revenue than for broadsheets. Elite papers, bought by a far smaller readership, rely more heavily on advertisements, which are tailored to the upmarket reader.[[117]](#footnote-117) Bingham claims that adverts in papers inhibited scrutiny of those products, although he does not say which products, for what or how they might be investigated.[[118]](#footnote-118) In contrast, Martens and Scott found that *Good Housekeeping Magazine* did express concerns about the safety of Vapona flykiller strips while continuing to advertise them.[[119]](#footnote-119) Perhaps this was one of the 'prominent issues' that Bingham described as advertising expenditure being unable to suppress.[[120]](#footnote-120)

### Sources: hobby/interest magazines

Like newspapers and books, magazines both shape and reflect practices and attitudes in the particular area that they are devoted to.

This chemical violence has been better examined from an American perspective because of local weed ordinances which focus on species that simply are not present in the UK, so the volume of herbicides and the anxiety and resistance they provoked inspired environmental histories to be researched. Despite the existence of a body of work acting as a stimulus for comparative studies of garden practices in Britain, the literature review demonstrated that the historiography directly concerning the use of garden chemicals in Britain is distinctly lacking. There are plenty of practical gardening books, magazines and newspaper columns that can help shed light on the use of garden chemicals between the 1930s and the 1980s, and I draw on these as my resources.

### Sources: advertisements

Advertisements can provide insight into which products were available, who they were targeted to, how products were expected to be used. Their inclusion or absence from newspapers and magazines speaks about the income stream for that vehicle, their They cannot tell us how successful they were at convincing people to use the product, similarly to the household manuals, they are only prescriptive, not portrayals of real situations. Still, these depictions or presentations of idealised use of the product can help to shape viewers’ ideas about chemicals and their use in the home, simply by being entertaining, informative and memorable. Neuhaus's book *Married to the Mop* takes printed and TV advertisements as its principle sources, and in analysing the phrasing and images, reflects on her own response to the adverts.[[121]](#footnote-121) By looking at advertisements found in specialist magazines as well as daily newspapers, as well as asking oral history respondents about the adverts that they remember, and their attitude to advertising in general, I will piece together a story about advertising chemicals to consumers.

A study that used material relevant to this thesis is Marten and Scott's survey of advertisements for cleaning products placed in Good Housekeeping magazine. They found a decline in the number and frequency of cleaning product adverts, which they associated with women's growing independence, and rejection of the all consuming role of housewife. Marten and Scott describe the 1960s as entering the aspirational era, showing images of idealised glistening homes, but did not inform readers about the practices and products involved in how to attain this level of cleanliness.[[122]](#footnote-122) In the sample of Good Housekeeping magazine examined for this thesis, that same decline was observed, but it is noteworthy that it was acknowledged by those companies who did advertise. A Goddard's silver polish advert explicitly stated "You must have better things to do than polish silver".[[123]](#footnote-123) Goddard's had focused on the use of time in previous adverts, as did most of the other chemical aids.

Martens and Scott also point out that from the 1950s in editorial for Good Housekeeping, there was a move away from germs as the target of cleaning products, to that of olfactory and visual appearances: smelling fresh, looking bright, with these qualities becoming the end themselves.[[124]](#footnote-124) They state that the threat from germs became a distant memory, and despite an interest in germs did not find the explicit references to food hygiene in the editorials and articles that they were expecting in greater frequency.[[125]](#footnote-125) However, food poisoning outbreaks such as Salmonella were rising in the 1950s,[[126]](#footnote-126) so it is surprising that the focus on germ management in the kitchen waned. Outbreaks of Salmonella influenced the advertising tactic of Zal disinfectant in 1975, which promised that the use of that product would eliminate these specific bacterial targets and protect the family.[[127]](#footnote-127) Food hygiene however, is specifically located in the kitchen, although the relationship to bathroom cleanliness is strong thanks to the spread of germs through the faecal-oral route.

Mark Abrams pointed out that advertising can reveal changing societal values. He observed a shift from products improving health with explicitly shown benefits for productivity at work to improving personal sexual attractiveness, and that images of maturity has been replaced by greediness.[[128]](#footnote-128) His focus on food and beverages, products that are ingested and assimilated, are quite different to chemicals used for any of the tasks discussed in this thesis, as they are specifically not used in this way. However, the adverts for chemicals still reflect, and possibly shape, the values behind motivations for using the products which are to protect the family, to protect cherished plants from the competition of weeds, to produce great photographic prints, and the message carried by the adverts indicate a preoccupation with time, convenience and safety.

This thesis will investigate the concept of germs as a motivator for using chemical cleaning products, by speaking to the users as well as looking at the messages about germs and the cleanliness granted through cleaning which are carried by adverts and packaging. I will locate the issue of germs to the bathroom, as although awareness and control of germs in the kitchen is useful, bathroom habits are a key distributor of germs that are not already present on the food stuff. As this thesis is not concerned with personal care products, such as soaps and handwashes, the focus of this germ study will be the chemicals and processes of keeping bathroom surfaces, including the lavatory itself, clean.

### Sources: government publications

Post-war government publications such as *Chemicals for the Gardener*,*[[129]](#footnote-129)* were written specifically for amateur gardeners at a point in time when the optimism in the fruits of the chemical industry were being tempered by observations of chemicals unintended effects. It is surprising then, that these documents, as well as numerous manuals and practical magazines which reviewed chemical products then advised on their use have so far not been analysed by historians in an attempt to understand how domestic users interacted with the range of chemicals and their rapidly changing availability. By using these sources, and the parliamentary debates that followed the first edition of *Chemicals for the Gardener*, I intend to reveal how they shaped, as well as reflected, attitudes and uses of chemicals at home.

# What resources will be used to investigate this?

Similarly to the methods used for other chapters, specialist magazines such as The Amateur Photographer, instructional books as well as references to photographic chemicals found in newspapers and government discussions will form the basis of the content, supplemented by user memories obtained through interviews as well as making use of the British Libraries collection of oral history recordings of British photographers. Therefore, some of these users are professionals rather than amateurs but what is more important than that distinction is the site of activity, the British home.

Dave Kenyon has written about the consistency of content in weekly magazine The Amateur Photographer when he sampled 1930s and 1990s copies. He classified the feature articles as consumer information, techniques, individuals' working methods and their results (all of which could relate to chemicals), making money from photography, which in addition to a large proportion of advertising, made consumption a principle feature of the magazine. Kenyon identified photography as part of the 1930s wave of consumerism for the lower middle classes, and justified the consumer focus of the magazine.[[130]](#footnote-130) While the dominance of chemical adverts dwindled in gardening magazines in favour of furniture, tools and gadgets, the pairing of chemistry with photography was stronger – photographs simply could not be visualised, whereas plants would continue to grow without chemical additives – meaning that the presence of chemicals could not diminish in the same manner.

In addition to the documentary sources used in other chapters, I will also draw upon museum collections, including those of Science Museum Group (SMG) northern members: the National Media Museum (NMeM) in Bradford, the Museum of Science and Industry (MOSI) in Manchester and a National Trust Property in Liverpool known as The Hardman's House. The Hardman's House belonged to a married couple, Chambre and Margaret Hardman, professional photographers who ran a portrait studio there and made it their home. The property is described as a 1950s time capsule, so only items that were in the house are displayed, and no active addition has taken place although the collection has been managed through disposal rather than acquisitions. In this house, photography and photographic processing was an activity pursued by both, so the idea that it was a sharply demarcated gendered activity is immediately challenged. The distinction between professional premises and domestic home is of particular interest in the context of this thesis.

NMeM has been part of the SMG since its inception, and MOSI was merged into the group in 2011. As a national museum, NMeM collected items with national significance or provenance, whereas MOSI focused on items that were made or had compelling use stories in the Greater Manchester area and where appropriate, referred offers of object donations to NMeM. Kodak products are particularly well represented at NMeM, as the company donated its whole collection in order to prevent it being dispersed, so many of these objects feature in the Kodak gallery. MOSI's Collected Cameras exhibition was dismantled in 2012, and displayed similar objects to the Kodak gallery. The archives at MOSI hold trade literature from photographic suppliers in the region, with a strong representation from Ilford due to the factory, and later headquarters, at Mobberly being within the catchment of collection.

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