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ORIGINAL ARTICLE

The agency of a marmalade machine: Gender, class and mechanical gadgets in the British Kitchen, *c*.1870–1938

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Abstract

This article explores the marmalade machine, a mechanical device designed to slice orange peel. These niche objects were manufactured between roughly 1870 and 1938 in Britain. As a so-called 'labour-saving' gadget, the marmalade machine sliced orange peel quickly and effectively, removing the tedious process of slicing orange peel by hand. However, like many labour-saving technologies, it also required an extended skillset from the housewife, by necessitating a mechanical and intellectual engagement from the user. Drawing on an eclectic range of source material, including physical examination of the machines, this article argues that the marmalade machine possessed agency through its affordances.

'Mrs. Agnew has much pleasure in informing Messrs. Follows & Bate that the Marmalade Machine purchased from them has given every satisfaction. By its use the work is done far better than is possible by hand, besides effecting a great saving of time and labour'.[1] According to a 1902 trade catalogue of Follows & Bate, a Manchester-based company that sold domestic appliances, this was the testimonial of a Mrs. Agnew of Stanraer for their patented marmalade machine. Marmalade machines – sometimes termed marmalade cutters – are mechanical devices designed to rapidly slice orange peel for making fruit preserves. The marmalade machine is one example of many so-called 'labour-saving' gadgets designed for slicing, mashing, or grinding food. They are typically metal and clamp on the kitchen table. Follows & Bate, founded in 1868, made a range of these gadgets, including mincers, bread cutters, potato chip machines, sausage fillers, grating machines and knife cleaners. Using the marmalade machine as an exemplar, this article explores how this type of kitchen gadgetry shaped the practicalities and cultural conceptualisations of housework. Putting this kind of gadgetry at the centre of scholarly analysis for the first time in nearly forty years, this article explores broader questions about the role of mechanical technology in fashioning and challenging social norms surrounding domestic labour, gender and class.[2]

From around 1850, labour-saving gadgets for the kitchen flourished.[3] As David Miller has established for the case in the United States, it was in the nineteenth century that technological and

manufacturing innovation meant that metal utensils could be mass produced.[4] Aside from utensils, the kitchen went through a number of technological developments in the nineteenth century. These included major structural changes, including utilities such as piped water, gas and, at the end of the nineteenth century, the introduction of electricity.[5] The development of the stove industry across the century – from an open to a closed range, and from gas to electric – has received the most scholarly attention.[6] Aside from changes in stoves, the nineteenth century also saw the first practical storage refrigerators in the 1880s.[7]

Recent work by Sara Pennell and Karin Dannehl has demonstrated the fruitfulness of examining the material culture of the early modern kitchen.[8] There has been less attention on this kind of late nineteenth-century gadget, and no work specifically on the marmalade machine. It has now been thirty-six years since Christina Hardyment's work on the mechanisation of the household that included a chapter on gadgetry.[9] Electrical items have fared better, with a fair amount of scholarly attention on international contexts.[10] A laser-focus on a particular domestic technology has been productive for historians such as Annabel Friedrichs' work on the sewing machine and Laura Humphreys' study of carpet sweepers.[11] This article uses a similar approach, by focusing for the first time on one particular type of mechanical food-preparation gadget. Focusing on just the marmalade machine offers the advantage of seeing how an object has been designed and represented in a culture that was highly classed, gendered and consumerist. In doing so, it demonstrates how micro-interactions with technologies were central to how the meanings of domestic labour were culturally constructed.

Why the marmalade machine? The marmalade machine is a convenient case study because many have survived and can be materially examined alongside related primary source material. It is unknown how many were manufactured, as although listed in the National Archives database, the records of Follows & Bate have been lost for several years.[12] The marmalade machine is thus a useful exemplar to explore kitchen gadgetry. However, that is not to suggest that the conclusions that can be drawn from this case study would be identical for every comparable technology. Nor does this article suggest that the marmalade machine was easier or harder to operate than similar gadgets. While some of the conclusions drawn may apply to similar gadgets, others are quite specific to the marmalade machine, owing to the particular way it works. Thus, this article seeks not to show that every similar device has the same practical and social functions. Instead, it suggests that every technology could produce its own unique effects tied to the specifics of its materiality and function. I describe this using the term 'material affordance'. First used by psychologist James Gibson, 'affordances' are the actions and opportunities offered and suggested by objects.[13] Scholars of material culture from across disciplines have used the concept of 'affordances' in their work.[14] In this instance, I preface with 'material' to indicate that for these gadgets, the possibilities for action are rooted in the materiality of their mechanism. This article also takes inspiration from the theory in material culture studies that objects have agency, suggesting that some of the marmalade machine's agency is rooted in its material affordances.[15] Concepts of object agency have a long history but perhaps most influentially, in Bruno Latour's 'actor-network-theory' which has shown how agency is dispersed between people and things.[16]

The study of material culture is now a well-established and productive field in histories of domesticity.[17] For this study, analysis consisted of physical examination alongside contextualisation using additional primary source material. The physical examination consisted of using the machines as they were intended to be used: clamping them onto a table, using them to slice orange peel and then cleaning them afterwards. This was essential for inferring the user experience, analogous with the 'experiential methods' used by Lucy Havard in her work on early modern recipes, and to understand the material affordances offered.[18] This technique corresponds with two of Jules David Prown's suggested stages in object analysis: 'sensory engagement' (touching, feeling, lifting), and 'intellectual engagement' (considering what the tool does and how).[19]

The marmalade machine could have been acquired by contemporaries through various means. Most likely, it would have been purchased directly from an ironmonger or ordered directly from Follows & Bate via their catalogue. Those local to Manchester may have purchased directly from their premises where, according to the floorplan, there was a showroom.[20] In addition, towards the end of

the nineteenth century, the independent ironmonger found themselves undercut by the growth of the department store, a newer option for the housewife seeking domestic technologies.[21]

Advertisements are useful for examining the social and cultural narratives into which the marmalade machine was written, and to trace how these changed over time. This is especially useful from a gendered perspective, as representations of gender and technology are closely bound.[22] A few of these advertisements appeared in women's magazines, but the bulk used in this article derive from the trade catalogues of Follows & Bate. Typically trade catalogues were aimed at the consumer to order directly from the manufacturer. Of eighteenth-century trade catalogues, Maxine Berg and Helen Clifford have suggested that their very existence suggests 'a large potential market at some distance'.[23] Trade catalogues from manufacturers grew considerably from the 1850s.[24] However, the intended audience for the Follows & Bate trade catalogues appear to be threefold. First, clearly there was an intention that customers would view them before ordering directly from Follows & Bate. This is clear from the contents of their 1902–3 season catalogue, which includes instructions on ordering.[25] Many of the products were clearly designed specifically for the home and illustrations depict a domestic setting. Second, many of the products were pitched at businesses, such as hotels, restaurants and butchers. Their products came in many sizes, and while the smaller models were for the home, larger ones would be more suitable for institutions making food in larger quantities. Third, some advertisements were clearly aimed at shops. This is evident from the 1902–3 catalogue that includes a facsimile of a showcard advertising the marmalade machine, to be used in shops, and the 1905 illustrated catalogue, which includes an advertisement for a display stand for shop windows.[26] In addition, the catalogues were also aimed at customers seeking other types of equipment, such as grindstones, engineering equipment and lawnmowers. Furthermore, comparison to similar advertisements in other magazines shows the same engravings were used to produce the images regardless of the specific destination of the advertisement. Thus, the representation of the marmalade machine was fairly consistent across different advertising media and to different audiences. This sometimes resulted in ideological tensions between the advertisement and the intended audience. Unpicking these tensions highlights the complex environment in which the social construction of domestic technology took place.

Marmalade machines, like other Follows & Bate food technologies, were not household necessities. A machine pitched for marmalade would likely have been aimed at the middle classes. The making of marmalade was traditionally a genteel pursuit; it required access to expensive preservation equipment and the funds to buy ingredients in bulk.[27] Thus, it is likely in the middle-class household that a marmalade machine would be found. Furthermore, while previously historians argued the middle-class woman did not undertake domestic labour herself – 'because any work that had to be done, [servants] had to do' – scholars now recognise that domestic servants were not as prevalent as once thought.[28] This, combined with the growth of labour-saving technologies in the kitchen, present the opportunity to reconsider the behaviour of the middle-class woman in the home, and the gendered and classed conceptualisation of domestic labour. It is worth noting that despite the persistence of the term 'labour-saving technology', generally such technologies did not save labour, or at least not in the sense that they saved time. As Ruth Schwartz Cowan has concluded in her pioneering work, such technologies often increased the labour expected of women.[29] As this article will show, the marmalade machine is no exception to this.

This article argues that the marmalade machine had a degree of agency, that was located within a network of power relations including the woman consumer and the manufacturer. The marmalade machine's agency was enacted through its material affordances, designed in by the creators, specifically in its ability to slice orange peel. At the most basic level, it had the power to change the process of making marmalade and the first section will show how the ability to slice oranges was written into broader cultural narratives about class, consumerism and saving labour. However, the marmalade machine also necessitated additional behaviour and skills from the housewife, as blades needed to be sharpened. Thus, the second section demonstrates how the marmalade machine required an intellectual engagement with mechanics by the user, thereby contributing to the changing demands of domestic labour prompted by technology. The final section suggests that the marmalade machine, and other technologies like it, blurred the classed and gendered boundaries that were cornerstones

FIGURE 1 Photograph of a 'patent' marmalade machine clamped to a table. Front view. Author's own. [Colour figure can be viewed at wileyonlinelibrary.com]

of Victorian and Edwardian middle-class domestic ideology. The marmalade machine and its makers built a conceptual bridge between the idealised traditional domesticity of the middle-class home and the mechanical, manual labour of working-class labour. These opposing ideas sometimes prompted mixed messaging in advertising, demonstrating how the marmalade machine's agency was constrained by broader social and cultural demands that shifted in the interwar period.

SLICING ORANGE PEEL

Marmalade is a fruit preserve, traditionally made of Seville oranges, but it could be made with any fruit with a rind. Oranges are peeled and the pulp boiled in water. The peel is shredded and added into the liquid with sugar. The traditional process of shredding marmalade with a knife was a time-consuming process: it effectively involved manually cutting up orange peel into the thinnest pieces possible. The various models of Follows & Bate's marmalade machines offered an alternative, quicker way to shred orange peel.

This article draws on a physical examination of three models of marmalade machine: the 'patent'; the 'magic' and the 'rapid' rotary model. The 'patent' marmalade machine – sold for sixteen shillings in 1905 – was one of the earliest models produced by Follows & Bate.[30] The machine (Figure 1) comprises two main pieces. The main body is a triangular shaped piece of tin-plated steel, that clamps onto a table. A large handle piece with an affixed blade slides down the front and connects at a pivot point, enabling it to move left and right as the orange peel is pushed through the chute. The exact date at which Follows & Bate started producing this model of machine is impossible to ascertain without the company records. An 1874 catalogue for Follows & Bate does not feature any model of marmalade machine, suggesting they were not yet producing them, but the model is likely late nineteenth century.[31]

FIGURE 2 Photograph of a 'magic' marmalade cutter clamped to a table. Front view. Author's own. [Colour figure can be viewed at wileyonlinelibrary.com]

By 1905, Follows & Bate were also producing a smaller model; the 'magic' marmalade cutter (Figure 2). This smaller model is made of a lighter steel and its mechanism is largely similar to the older 'patent' model. Like the bulkier 'patent' model, the user would push orange peel down the chute with a wooden stopper and move the handle left and right from the pivot point, held in place by a wingnut. Given its smaller size, it was likely more suited for domestic use, rather than the kitchens of hotels and restaurants and was more affordable at seven shillings and six pence.[32] It is perhaps for this reason that marketing switched to a language of 'cutter' over 'machine' so as not to alienate the middle-class female consumer. Indeed 'marmalade machine' implies that it is the machine making the marmalade. 'Cutter' highlights its more specific function to slice orange peel. The 'magic' cutter was sold alongside the larger 'patent' kind; variations of the larger models were made up until the 1930s.

In the 1930s, Follows & Bate were also producing a new kind of marmalade machine: the 'rapid' rotary model, patented in 1934 (Figure 3). It operated in much the same way as the earlier models, but with two differences. First, the handle for the 'rapid' model went around in a circle, rather than side-to-side. Second, the blades were harder to access, encased beneath a metal plate.

Although these models differ in size, they have the same effect of removing the step of painstakingly hand-slicing orange peel. Instead of mobilising multiple fingers and a sharp knife, the hands were removed further from the actual cutting. I sliced orange peel with all three models of marmalade machine, to similar effect. Inferences from using the machine are made with caution; they are of course old and rusty, and it is impossible to experience a machine identically to the contemporary users. It is also not clear if the blades in the machine were the original. Aside from these caveats, the machines are very good at slicing orange peel.

The marmalade machines were consistently advertised with reference to time and saving labour. In his classic thesis, E.P. Thompson argued that the industrialisation of Britain prompted a new time-discipline; one in which time was seen as a commodity, which ultimately bled into all aspects of society rather than just the factory floor.[33] This emphasis on time, and the related concept of efficiency,

FIGURE 3 Photograph of a 'rapid' rotary marmalade machine. Front side. Author's own. [Colour figure can be viewed at wileyonlinelibrary.com]

became embedded into domestic life in modern Britain. Follows & Bate's advertising lent heavily on this rhetoric. Time units were broken down into the number of oranges that could be cut per minute: 'Slices Three Oranges a Minute'.[34] For example, a testimonial for the 'universal' marmalade machine (a similar model to the 'patent') printed in the 1902 catalogue includes a quote from 'F. B. Rooke'. He described how 'twelve oranges can be cut up beautifully fine in five minutes with this machine. It takes my wife two hours to cut up the same quantity by hand'.[35] Here the labour-saving rhetoric created a new language of production and efficiency: speed of orange slicing.

In this instance, the marmalade machine and the labour-saving rhetoric produced a new micro-temporality of how many oranges could be sliced in a given time period. As Hannah Gay has shown, new conceptions of time should be seen as layering upon each other, rather than completely replacing older conceptions.[36] Furthermore, Rachel Rich has argued that domestic advice literature demonstrates the 'multiple, overlapping temporalities' women operated within.[37] Notably, the marmalade machine also existed within a different temporality: seasonality. Traditional British marmalade can only be made when Seville oranges are in season, typically from December to March. Thus, if a marmalade machine was used, there was only a small window of opportunity. For this reason, it was possible to rent a machine: the 1902–3 trade catalogue includes sample showcards reading 'LENT ON HIRE AT ONE SHILLING A DAY'.[38] Other mechanical technologies that were targeted at a specific

fruit or vegetable had similar seasonality. Hardyment has noted that the limited uptake of the apple parer in Britain may have been due to the cost of owning something that could only be used once a year.[39] Thus, the domestic technologies the housewife used shifted with the seasons. The marmalade machine afforded particular behaviours at particular points in the year, although its agency in this regard was arguably shared with mother nature's seasonal rhythms.[40] This creation of a new domestic temporality therefore overlapped with existing ones, and was the result of multiple actors' agency in the network of domestic food production: the creators of the object, the advertisers, nature and the housewife. This network of agency rested on the material affordance of the marmalade machine to slice orange peel quickly. In successfully creating the mechanism in this way, Follows & Bate activated the agentic potential of the marmalade machine, which continues to afford the slicing of orange peel, long after the business itself was over and its original inventors dead.

The option to rent a marmalade machine also points to economies of scale: marmalade is a preserve, and thus can be made in large quantities and stored. Renting made them accessible to lower-income families. Similarly, some Follows & Bate products were made so that they could be adapted into another. For instance, the 1905 catalogue advertised a 'magic' marmalade cutter attachment that could be used with the number one 'magic' chopper so that it was 'instantly converted into A PERFECT MARMALADE MACHINE'.[41] These smaller, cheaper machines might have been purchased by working-class or lower middle-class families. As Pennell has demonstrated for the early nineteenth-century kitchen, gadgets may have been used for multiple purposes to save money.[42] Thus, renting a machine or having a multi-functional gadget in the home allowed lower-income families to benefit most from the efficiency of the machine at a lower cost.

The marmalade machine was only one type of mechanical device that clamped on the table, and the presentation of the machines as *for marmalade* was a deliberate marketing choice. Although the machines may have been designed with orange peel in mind, they could be used for slicing practically any foodstuff small enough to fit down the chute. For instance, a 1903 specification for a marmalade machine describes the invention as an 'apparatus for cutting or slicing oranges cucumbers potatoes carrots apples and other fruits or vegetables which it is desired to cut into thin slices or shreds by means of a knife or knife blade carried by a reciprocating lever [*sic*]'.[43] The specification does not use the same name that the products were advertised under, but the diagrams indicate this was for the 'patent' machine or a similar model. Furthermore, this is a reminder – as Annie Gray has pointed out – that kitchen objects designed for one purpose might easily be used for another.[44] The marmalade machine affords slicing any vegetable, or indeed any other sliceable object that would fit down the chute. The emphasis on marketing the machine for marmalade making was a result of decisions made by Follows & Bate, who designated this object as for slicing orange peel.

It might be assumed that other technologies – which had a similar function and were produced in abundance by Follows & Bate – might do the same job of shredding orange peel. However, in accordance with my own physical examination, contemporary accounts suggest the design of the marmalade machine was especially effective at slicing orange peel. By the interwar period, recipes commonly appeared in newspapers. Recipes, naturally, are a form of domestic advice, and do not necessarily represent any opinion beyond that of the writer. Nevertheless, for what it is worth, one recipe, printed in 1934, advised against the use of a mincer to slice oranges, as a mincer 'rather spoils the appearance of the marmalade'.[45] The marmalade machine provided the finely shredded peel which other kitchen gadgets could not; while in practice it affords slicing anything, it was particularly successful at slicing orange peel fit for the purpose of making marmalade.

Of course, the success of a product depended on the willingness of women consumers to purchase them. While making marmalade represents a traditional, genteel form of production, the marmalade machine existed within the realm of modern consumerism. In this regard, the marmalade machine was a bridge between the old and the new. Advertisements dealt with this tension by situating the marmalade machine as a modern device that could aid traditional social and cultural ideals. A 1905 advertisement for the 'patent' machine included a testimonial from Mrs. Fleming, of Manchester, who wrote 'I know I shall be the envy of all my friends when they see how nicely and finely cut my

Marmalade is this season'.[46] In this example, the precision of the machine is also presented as an aid to social success; homemade marmalade was not necessarily solely about fulfilling domestic or familial obligations but a means to demonstrate one's social status in kinship groups. The marmalade machine embodied social qualities and was written into a narrative that promoted a sense of domestic superiority among community circles. In this way, the marmalade machine participated in the creation of a new form of social currency: the thinness of one's orange peel slices.

The marmalade machine could also standardise the thickness of the orange peel slices. Follows & Bate's showcards, made for display in ironmongers, noted: 'The only Machine that will cut Oranges and Lemons into uniform slices for Marmalade at home'.[47] This appeal to uniformity mirrors changes that were happening within industrial settings and beginning to seep into the home. Links between the management and rationalisation of industry were, as Judy Giles had observed, being applied to domestic work by the early twentieth century.[48] As a gadget that worked in a particular way, that produced a standardised result (evenly shredded orange peel), the machine dictated how marmalade must be made. In so doing, it eliminated any variation that might arise by the former process of slicing orange peel by hand. This might also be read as raising the standards required of domestic labour. As Cowan argues, domestic technology raised the expectations placed on women.[49] In these advertisements, a new standard was created, in which orange peel must be thinly and evenly shredded.

With the growth of commercially produced marmalade, it can be reasonably assumed that there was an increasing standardisation and expectation over the size and consistency of the orange peel. As C. Anne Wilson has noted, the technologies that allowed the mass shredding of marmalade first happened in industrial settings, not in the home.[50] The purchase of shop-bought marmalade was in its 'heyday' in the Edwardian period.[51] As the marmalade machine came onto the market for use in the home, marmalade was also being mass-produced in the factory. In the late nineteenth century, marmalade 'became an affordable grocery staple'.[52] The making of preserves within the home was in decline; according to one recipe book written in 1886, 'In the present day, probably, to every one who makes his own jam there are thousands who buy their jam ready made'.[53] Once there was no longer a need for the machine in the home, its affordance to slice orange peel was practically less relevant, and its agency declined.

MAINTENANCE AND REPAIR

The agency of the marmalade machine, however, went beyond its simple function to slice orange peel. It also demanded an intellectual skillset from the housewife, in order to use, maintain and repair them. Naturally, running a home required undertaking a range of different activities, all of which might be deemed to use different types of skill, such as cooking, cleaning and sewing. The maintenance of the marmalade machine required a degree of technical skill and intellectual engagement in order to use and maintain it. Judy Wajcman has established: 'Technological "things" are meaningless without the "know-how" to use them, repair them, design them and make them. That know-how often cannot be captured in words. It is visual, even tactile, rather than simply verbal or mathematical'.[54] Thus 'technical skill' can be boiled down to this 'know-how': knowledge of the materials the machines are made of, how the mechanisms work and how they fit together. Thus, the marmalade machine holds an additional layer of agency in requiring the user to have the 'know-how' of how to use it.

Successful use of the marmalade machine requires knowledge of when and how to sharpen the blade. This, as we have seen, is what marks the marmalade machine as different from similar products; it is the presence of the sharp blade and the side-to-side (or, for later models, round-and-round) mechanism that allows it to slice oranges effectively. Advertisements suggest this process was easy: an advertisement for the 'magic' model noted that 'the Double-Edged Cast Steel Knife is easily detached for sharpening'.[55] A close look of how the blades are affixed gives an indication of how the process worked. While the handle pieces come out of the main body of both models with relative ease, the removal of the blade itself is more complicated. In the 'patent' model, this is a double-edged blade

of 3 × 14 cm, held in place by two rivets. For the 'magic' model, the blade is much smaller, measuring just 1 × 4 cm. In both models, the blade would have to be removed with tools and then ground against a hard, rough surface, such as a honing steel or a grinding wheel. As well as being fiddly, as a small, double-edged blade, it would also be dangerous. It is in this respect that the marmalade machine asserts its agency most forcefully: requiring repair work akin to mechanical labour at a point when it is no longer optimally functioning.

This kind of maintenance work was possibly done outside the middle-class home. Advertisements from Follows & Bate suggest that certain items could be sent back to their factory for repair. For instance, Follows & Bate also made knife cleaners. These gadgets were large wooden barrels, in which knives would be inserted into holes, and between two wheels. When a handle is turned, the wheels inside polish the blades. These were amongst the most expensive items made by Follows & Bate; the smallest of the 'Family' knife cleaners was £1.5s, and the most expensive £3.5s.[56] The main piece is held together by eleven screws on each side and taking it apart would require unlatching the cast iron metal legs from the wooden barrel. The screws are not knurled and would require the use of a tool such as a screwdriver. Once opened, it would be necessary to identify the problem and repair the internal mechanism. Owing to the difficulty of this, consumers willing to send the knife cleaner back to Follows & Bate would benefit from their repair service, as advertised in the 1905 catalogue, and their knife cleaner 'made practically equal to new'.[57] The marmalade machine, as a smaller and less complex device, could likely be repaired and maintained by more local services, such as knife grinders, a type of costermonger.'[R]azor and knife grinders' and 'knife cleaners' were classified by Henry Mayhew as 'Those who mend things in the streets' in his *London Labour and the London Poor* (1861).[58] Little is known about them, although some photographic evidence remains.[59] Similarly local ironmongers offered repair services.[60] The marmalade machine, in requiring maintenance, was also symptomatic of the broader networks in which the housewife operated. Like other mechanical objects in the home, it was a material connection between the middle-class home and the external expertise needed to support its functioning.

While the actual process of knife sharpening might have been outsourced to a working-class labourer, it should be remembered that a degree of knowledge would be required of the female user to identify when the blades needed sharpening. This might be evident from, for example, the machine getting clogged or the orange peel not being sliced cleanly. It speaks to the agency of the marmalade machine in necessitating this intellectual judgment from the housewife; the agency that was activated when a mechanical gadget was made for the middle-class home. Lorraine Daston has argued, 'Even if they do not whisper and shout, these things press their messages on attentive auditors – many messages, delicately adjusted to context, revelatory, and right on target'.[61] If a marmalade machine could talk, it would tell its user they need to know about mechanics and metalwork to clean it and maintain it correctly. Agency was dispersed between the machine and the user: the marmalade machine necessitated that the housewife had the knowledge and skills to maintain it correctly or be able to identify when maintenance was required, but if the housewife did not do this, the machine itself could no longer function and its own agency declined.

While sharpening the small blade was relatively specific to the marmalade machine, there were other aspects of maintenance that applied to other objects of the same category. For instance, specific parts, like the clamp, would need regular lubrication to ensure the mechanism did not cease up. In addition, knowledge of metalwork would also be required. Follows & Bate marmalade machines were made of steel: the 'patent' model, for example, is made of steel with a white enamel lining along the inside of the chute. Similarly, the 'magic' model is made of a lighter weight tin-plate steel, also with a white enamel chute. The different pieces and materials of the marmalade machines would require a working knowledge of how to clean them. This knowledge became increasingly explicit throughout the nineteenth century owing to the flourishing of the domestic advice manual. These texts – while reflecting ideals and not realities – encouraged women to embrace science and technology in housework.[62] Mrs. Beeton's *Book of Household Management* is the most well-known example, which offered 'A few words on the metals and compositions used in the manufacture of cooking

utensils'.[63] She described the benefits and drawbacks of different metals for kitchen utensils (although not specifically this type of gadget), including a discussion of aluminium, copper and wrought steel.[64] Thus the marmalade machine required the housewife to have an intellectual engagement with the object in order to maintain it. Broadly speaking, this would apply to similar gadgets made of metal, suggesting they shared this kind of agency.

There is little written evidence explicitly stating the processes of maintaining or using the marmalade machine. Although domestic knowledge was written down extensively in the form of recipes and domestic advice manuals, instructions with specific details, labelling the parts and describing precisely how the machine works have not been found. Additionally, I have been unable to find original instructions from a Victorian or Edwardian marmalade machine. This is not to say they did not exist. However, I have been able to source a 'magic chopper' from Ebay with its original box and instructions; this was a mincer that clamped onto the kitchen table similarly to the marmalade machine. The model number of the 'magic' chopper – 'No. ooo' – and the accompanying mincing disks seem to match advertisements from the 1920s, suggesting they were manufactured from around this time. However, this particular mincer was acquired from Ebay and came with an envelope dated '1956'; presumably this particular mincer was acquired by the last owners then, but the model was produced from earlier. With some certainty, we can derive conclusions from the 'magic' chopper about the 'magic' marmalade cutter. Aside from the fact they were both from the 'magic' line of products, both also clamped onto the table and were made of tinplate steel. By the Edwardian period, they were Follows & Bate's signature products and featured most heavily in their trade catalogues. In the 1905 illustrated catalogue, they were the only two products that had a full-sized colour illustration, and they both featured on the front and back covers of a 1920 catalogue.[65]

The 'magic' chopper came to me in a small square box. Notably, it does not fit in the box unless it is taken apart. This alludes to a different step of intellectual engagement: putting together the device for the first time. The surviving instruction tag give some clues as to how it fits together: 'Screw up tight the thumbscrew at handle end, and take care the outside cutter fits flush on the projection at end of propeller'.[66] There is, however, no diagram to indicate which parts are which, so a certain degree of prior knowledge was assumed to understand the terminology. Manual dexterity would also be needed to achieve this. The instructions also outline how the different 'outside' cutters – that is, the disks of metal that go over the exit hole of the mincer, forcing the food through different shaped holes – is meant for different types of foods. On cleaning, the instructions note: 'Before the new Chopper is used, rinse thoroughly in hot water, and pass a little bread through, to clean the working parts, repeat this after use, wipe and put away in a dry place'.[67]

From this comparison, we can appreciate the skills and 'know-how' needed in using and operating a mechanical device like this: understanding mechanical terminology; putting together and using the mechanism in the absence of specific instructions; and specialist knowledge on how to clean and maintain it. These skills apply to many mechanical food gadgets. As has been shown, the blade of the marmalade machine affords sharpening. Its agency lies in requiring its user to possess the relevant skills to know when this maintenance is required. But the marmalade machine cannot be successfully operated without the housewife possessing these skills and knowledge. Agency, then, lay in a symbiotic relationship between the marmalade machine and the user.

FEMININITY AND THE MARMALADE MACHINE

The existence of the marmalade machine – and other technological, fiddly objects in the home – had a resonance beyond the micro-interactions within the middle-class kitchen. These objects also had a role in shaping constructions of femininity across the period, by conceptually breaking down boundaries of class and gender. However, as this section will show, the representation of the machine and its female users' agency was visually confined by social and cultural ideals.

In the late nineteenth century, the types of skill and knowledge that were needed to engage with the marmalade machine were typically associated with working-class, manual labour. This is evident in the words of Frederick Follows, inventor and owner of Follows & Bate. Follows delved into the realm of domestic advice in 1893 when he delivered a lecture at the Manchester School of Domestic Economy in his capacity as a local businessman and member of the Manchester Technical Instruction Board. His advice gives some sense of how his products were written into his vision of femininity. Domestic advice came in multiple forms such as educational institutions, recipe books, and most popularly, domestic advice manuals. Domestic advice naturally did not reflect reality, especially as it presumed a budget and lifestyle that was out-of-reach for the average middle-class woman; such manuals 'can never be clear windows onto the kitchens of the past'.[68]

Follows' lecture, 'Economy of Time', was part of a series on *Common Sense for the Housewife* and later printed. In his pitch for women to save time in domestic labour, he suggested the extra time spent might be used for 'outdoor recreation' and 'intellectual pleasures', but also 'to open her heart and sympathies, not only to her husband, but to the cry of suffering humanity too (if she hears it), and God knows how much there is in this great city wherein we dwell'.[69] In this passage alone, Follows alluded to his support of the growing educational opportunities for women, as well as reflecting a version of femininity as angelic and in service of others. But what is perhaps more interesting about Follows' talk, is the conceptual bridge he drew between domestic labour and working-class factory labour. He referred to the technical handiwork that should be employed in domestic life, especially in using technologies:

> if the hand and eye were specially cultivated, the use of common tools taught, and the processes employed in the manufacture of objects in daily use in our houses explained, then I maintain that the value of such a manual, industrial and technical knowledge would add to the pleasures, the duration, and the happiness of life, and would promote the better fulfilment of women's mission at home.[70]

Although drawing on some ideas of traditional femininity, Follows also reflected newer understandings of women's domestic role. In his view, domestic labour could be better achieved with the adoption of bodies of knowledge (manual, industrial and technical) which spatially existed outside the home, and in the realm of working-class labour. Domestic knowledge was being made increasingly explicit throughout the nineteenth century, particularly through domestic advice and education.[71] As noted above, this was frequently intertwined with scientific knowledge. However, in this instance, it is more unusual to see such an explicit link between manual and industrial labour with femininity and domesticity.

This talk demonstrates Follows' awareness of the need to convince women consumers to purchase new technologies. There is a widely acknowledged relationship between advertising products, and domestic advice.[72] Follows recognised the role women played in the success of domestic technologies. 'In America', Follows explained:

> ladies discover their wants, I think, more quickly than they do in England- I mean their needs so far as labour-saving appliances are concerned. When a constructor or inventor *knows* what is required, that is half-way towards making it, and I am sure manufacturers will be willing to pay for it handsomely. When the necessity for time and labour-saving appliances is more keenly felt than it is at present, I feel that English manufacturers, aided by the expressed needs of society, and the enthusiasm of their lady friends, will not come one whit behind their American cousins.[73]

Notably Follows suggested women had an important role to play in the success of domestic technologies, even suggesting that women could be paid 'handsomely' for offering their own expertise. This correlates with the work of Anne Clendinning and Carolyn Goldstein, who have shown that from

FIGURE 4 Advertisement for the 'patent' marmalade machine and 'magic' food chopper. Courtesy of British Library Board, P.P.6004.od. Woman at Home, December 1910, p. 37.

the late Victorian period, women in Britain and the United States had a presence in the technology industries.[74] In Follows' words, the agency of both the machine and women is seen in conjunction with his own. Like other mechanical gadgets, the marmalade machine required the 'know-how' of the user, afforded by its design. Women retained agency in the potential to offer their expertise to the manufacturers, and in their right to choose what to buy.

However, this agency of both the marmalade machine and its female users was not always clearly articulated in advertising. Despite being advertised for women, sometimes this conflicted with the chosen imagery. Typically, Follows & Bate gadgets were depicted being operated by 'floating hands' rather than a full-bodied person. For example, an advertisement printed in *Woman at Home* for the 'patent' marmalade machine (and the 'magic' chopper) shows disembodied hands using the gadget clamped to the kitchen table. Notably, the hands are clearly adorned with the sleeves and cuffs of a male user (Figure 4). As Victoria Kelley has shown, the context in which an advertisement appears is central to its analysis.[75] *Woman at Home* was aimed squarely at the lower-middle-class woman, who was actively engaged in domestic life. These lower-middle-class women were precisely the audience likely to be engaged in some domestic labour themselves, alongside their sole servant if they had one. Of course, the machine itself affords use by a man or a woman. In this respect, this visual representation is an accurate representation of its affordances. But it jars with its intended social setting. The 'patent' marmalade machine, as a larger model, may have also been pitched at restaurants and hotels, and thus the hands reflect use by a male employee. In this particular advertisement, it is being pitched at a lower-middle-class woman, but this is contradicted by the imagery. Direct imagery showing a middle-class woman operating a mechanical gadget has been avoided.

The 'magic' marmalade cutter, however, tended to be depicted in use by women's hands. As a smaller model, the 'magic' cutter was likely to be used in a domestic setting and thus operated by a woman. Where women's sleeves were depicted, they suggest a servant's uniform rather than a middle-class woman, as shown in Figure 5 from the 1905 catalogue. This was standard imagery for advertising at this time. As the domestic servant was considered a marker of middle-class status, the visual presence of servants imbued products with an aspirational quality. Kitchen products were no exception to this. Clendinning has shown that domestic servants were used in imagery accompanying advertisements for gas cookers around the same period.[76] When a full-bodied user was depicted using any Follows & Bate technology in the pre-war period, it tended to be a servant, such as the 1905 advertisement for a kidney-bean cutting machine – notably with similarly styled sleeves to the bodiless hands.

FIGURE 5 Advertisement for the 'magic' marmalade cutter. Illustrated Catalogue, no. 750, 1905, p. 38. Cambridge University Library, 1995.11.3970. Photographer: Amélie Deblauwe/Reproduced by kind permission of the Syndics of Cambridge University Library. [Colour figure can be viewed at wileyonlinelibrary.com]

Although servants were not as prolific as once thought, the visual references make perfect sense in the context of middle-class domestic ideology. But they nevertheless complicated the classing and gendering of the marmalade machine; making marmalade was a genteel pursuit and the machines would likely have been used by the housewife herself, not least because of the lack of domestic servants.

The 1905 trade catalogue also features the only pre-war advertisement for a marmalade machine that has been found printed in colour. It is a full-page image of a seemingly middle-class woman operating a 'patent' marmalade machine (Figure 6). Drawing on the imagery of the Arts and Crafts movement, she is wearing brightly coloured, loose-fitting clothing, with visible bare shoulders, and her hair adorned with accessories. Traditional ideals of femininity might have been seen in opposition with the marmalade machine as a mechanical gadget, and thus imagery of a domestic servant was favoured. However, the imagery of the Arts and Crafts movement, a facet of modernity, expresses a new type of femininity that is not at odds with the marmalade machine. The articulation of a modern femininity has often been dated as emerging in the twentieth century, particularly after the First World War, such as in work by Judy Giles and Joanne Hollows.[77] The marmalade machine was the ideal machine for this. As making marmalade was a genteel pursuit, it maintains some traces of traditional domesticity. Notably, the only other coloured advertisement found was for the 'magic' chopper that did not depict any user at all: instead pigs, chickens and cows are shown to sacrifice themselves by diving into the mincer.[78] A housewife mincing meat might be considered less genteel and more laborious than the delicate art of making marmalade. As the marmalade machine was designed to effectively slice orange peel, it had the power to be seen in use by a modern middle-class woman.

The visual representation of the marmalade machine shifted again in the interwar period. It was a period in which, according to Joanne Hollows, conceptualisations of domestic cultures and femininity shifted, and publicly the home was re-articulated as 'modern'.[79] This is reflected in the instructions for the 'rapid' model that illustrates a change in visual strategy. The image on the front of the instructions is a woman operating the machine.[80] Her outfit, with an apron, is clearly not the traditional servants' uniform, reflecting the decline of the servant class, and possibly the 'ambiguous visual iconography'

FIGURE 6 Illustration of woman operating the patent marmalade machine. Illustrated Catalogue, no. 750, 1905, p. 36. Cambridge University Library, 1995.11.3970. Photographer: Amélie Deblauwe/Reproduced by kind permission of the Syndics of Cambridge University Library. [Colour figure can be viewed at wileyonlinelibrary.com]

of domestic workers between the wars.[81] Moreover, according to Joy Parr, the relationship between kitchen design, technology and work shifted.[82] Accordingly, this woman is depicted in a modern, tiled kitchen. The actual user of the marmalade machine was likely the same: a housewife, probably middle-class. This advertisement presented a more straightforward visual relationship between the housewife and the machine, but only as the aspirational imagery of the domestic servant declined, and social ideals about women, class and technology shifted.

Incidentally, the 'rapid' model was more complicated and fiddlier to use than the earlier models, as the blade was encased inside. This would substantially complicate maintenance. The blade is on the inside of the machine and access requires undoing two wingnuts, removing the handle and taking off the front piece. This is clear from surviving instructions held by the Science Museum Group: '*After use*, remove the two Wing Nuts and loosen the Cover Plate, then remove the knurled thumbnut on the spindle end and draw out the spindle which carries the cutter plate'.[83] Essentially, to clean the

machine it had to be taken entirely apart. The complexity of maintaining the 'rapid' rotary model was expressed in a 1933 edition of *Good Housekeeping*:

> Before use the makers advocate the application of a little bit of oil between the thumb nut and the bottom of the spindle. In order to keep a machine of this type in good condition it should be thoroughly cleaned and dried each time it is used. Merely drying with a tea-cloth is not sufficient. The two-wing nut should be removed to loosen the cover plate, and the spindle which carries the cutting blades drawn out. The parts should be dried and placed in a warm oven or some similar spot where they can get really thoroughly heated through, so that surplus moisture is evaporated and rust prevented.[84]

The steps required to properly clean the machine and prevent rust were complicated. The skillset needed to maintain the machine was thus further extended by this newer model. It is not clear why Follows & Bate began to make a new model that was more complex than earlier versions. The presence of these instructions in *Good Housekeeping* is evidence of how technical knowledge was becoming increasingly embedded within women's culture. Indeed, women's magazines have been established as a site at which femininity is constructed and contested.[85] *Good Housekeeping* was launched in Britain in the 1920s, and served to tighten the links between women's media and domestic technology.[86] According to Hollows, 'In the pages of *Good Housekeeping*, the role of the middle-class housewife was portrayed as being on a par with masculine middle-class work in the public sphere'.[87] In this instance, the mechanical interactions and skills required by the marmalade machine had become integrated into mainstream women's media. Ironically, however, by this period, the marmalade machine had outlived its usefulness. Domestic production of marmalade was in decline, and Follows & Bate was absorbed into Qualcast, a lawnmower company, in 1938.[88]

CONCLUSION

This article has used a micro-historical approach to demonstrate that an object like the marmalade machine could exercise agency within the networks of domesticity and consumer culture. A physical examination of the marmalade machine has been essential in inferring its material affordances, the key to its agency. By using an experiential object analysis method (using the object as it was intended), the affordances that would have been offered to the contemporary user have been revealed. In context with other source material, this analysis has shown the nuances and contradictions of the marmalade machine's place and agency in contemporary culture.

The marmalade machine ultimately widened the demands on the middle-class housewife by requiring technical skills and behaviours. As the first section showed, this was rooted in its affordance to effectively slice orange peel and marked it as different from similar mechanical gadgets such as mincers. It is also owing to a specific mechanism that incorporated a blade that necessitated sharpening, which may have happened outside the home. In this respect, the agentic potential was activated by its makers, when the affordances to slice orange peel and sharpen the blade were designed into the object.

Like many other labour-saving technologies, the marmalade machine raised standards by creating new expectations of the thinness of one's orange peel and necessitating new skills, such as knowing how to put it together or when it needed maintenance. As the marmalade machine cannot function without this knowledge, agency was interspersed between object and user.

As has been shown, the affordances and agency of the marmalade machine existed within the confines of a gendered, classed and consumerist culture. In the words of Follows, the conceptualisation of domestic labour was shifted, building a bridge between the middle-class home and working-class mechanical labour. This conceptualisation cut across traditional boundaries of gender and class. But this was not reflecting in advertising, which favoured traditional middle-class ideals. The agentic potential of the marmalade machine to challenge gender and class norms was limited by the decisions

of the manufacturers and advertisers, whose desire to appeal to middle-class values controlled the advertising strategy. It was only in the interwar period, when the public relationship between women, domestic labour and technology shifted, that advertising and women's magazines reflected the more explicit link between the housewife and the marmalade machine.

The marmalade machine is only an example of a particular type of technology. In some ways, the agency that it held will have been shared with similar mechanical gadgets; others will have required housewives to understand types of metal for maintenance or how to put together fiddly mechanical pieces. In this respect, mechanical gadgets collectively can be seen as asserting agency in raising the expectations for domestic skills on housewives. However, as has been shown, it also held its own particular agency rooted in its material affordance of effectively slicing orange peel and requiring specific sharpening maintenance.

This article has demonstrated the value of a physical examination of technologies to explore their affordances and their agency, and how they intersect with broader social norms as well as the agency of other historical actors. This article has exhibited the fruitfulness of a micro-historical approach on a niche object, by putting the marmalade machine at the centre of scholarly analysis for the first time. The conclusions drawn here can be extended far beyond the marmalade machine, and beyond this particular type of mechanical gadget. All new domestic technologies demand a new 'know-how', and thus exert more demands on domestic labour. Housewifery, then, is not just the responsibilities and practicalities of maintaining the home, but a series of interactions between women and objects. New technologies come and go, but the relationship between women, technology and consumerist culture remains, constantly refracted through broader social norms.

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ENDNOTES

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