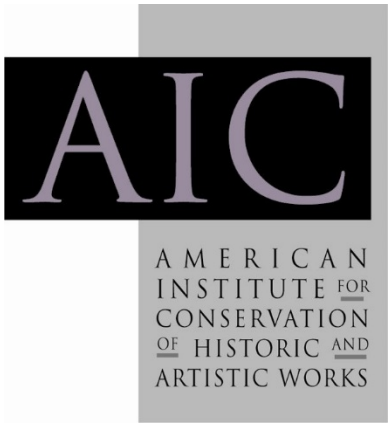

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BON APPÉTIT? PLASTICS IN JULIA CHILD'S KITCHEN

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ABSTRACT

The Smithsonian Institution accessioned Julia Child's kitchen over a decade ago and it was recently packed up and moved to a new exhibition space at the National Museum of American History. As part of that process, students from the Museum Studies Program at The George Washington University performed condition surveys and made preventive conservation recommendations. A key discovery from the survey was that several of the plastics in the kitchen are weeping, discolored, and off-gassing acidic vapor. This situation proved to be a prime example of the issues faced by museums as more and more contemporary plastic objects enter collections. The conversations between curators, conservators, and students regarding whether or not to display degrading plastics is discussed along with a comparison of conditions between the old and new exhibitions.

1. INTRODUCTION

For over 10 years, the installation of Julia Child's kitchen in the Smithsonian's National Museum of American History (NMAH) has been a popular draw for visitors. People who feel they know Julia through televised cooking shows, books, and the recent Hollywood film *Julie & Julia* come to NMAH to get a firsthand view of her familiar kitchen. Visitors appreciate that everything in the kitchen—with the exception of bananas, tomatoes, and the floor covering—is original. The curators and staff at NMAH are committed to maintaining this level of authenticity, though it may prove difficult in the future as the materials, particularly the plastics, age and deteriorate.

Having served as a working home kitchen from 1961 until its donation to NMAH in 2001, it contains plenty of well-used plastics, from silicone spatulas to a Rubik's Cube, along with more traditional kitchen items. The combined factors of original use, long-term exhibition, and inherent vice have affected how many of these items are aging.

In 2010, plans to move the kitchen into a renovated gallery prompted NMAH staff to carefully evaluate the exhibition and its contents. Condition surveys performed in 2011 by graduate students in the Museum Studies Program at The George Washington University (GWU) revealed that many of the plastics were actively deteriorating, exhibiting color change, weeping, and off-gassing acidic vapor. This sparked a discussion among NMAH staff and the GWU students about whether to continue displaying these items in the new exhibition.

Conservators generally do not recommend leaving an object on display when it is deteriorating and could potentially harm nearby materials, but NMAH curators raised a number of important issues about how this would affect the interpretation of the kitchen. For example, what would be the impact of removing a few original artifacts? Would they be replaced with reproductions? Would the space be left empty? At what point would the kitchen no longer be in its state as used by Julia Child? How would this change the visitors' experience and the museum's interpretation of the space? Finding a balance between the commitment to be as authentic as possible, even if it means displaying deteriorating plastics, and the desire to preserve these objects is the focus of this article.

2. BACKGROUND

In 2001, Julia Child donated the kitchen from her Cambridge, Massachusetts home, where she lived since 1961, to NMAH. The room was her home kitchen as well as the set for her last three television cooking programs, which aired in the 1990s. In all, 1,200 items including cabinetry, countertops, door moldings, appliances, a six-burner range, numerous tools and gadgets, cookbooks, and, yes, the kitchen sink were brought into the museum's collection.

NMAH opened the exhibition *Bon Appétit! Julia Child's Kitchen* at the Smithsonian on Julia's 90th birthday in August 2002. Visitors could peer into the reassembled kitchen through acrylic viewports added to the doorways and one of the walls. Julia attended the opening and declared it so perfect she felt like "turning something on and starting to cook!" (Johnson 2011). What was meant to be a short-term exhibit proved so popular that it remained on view for a decade. The placement of the kitchen in a temporary gallery lacking full walls and a ceiling, tailored lighting, or environmental controls eventually had an impact on some of the displayed objects.

In 2010, NMAH began planning major renovations to the HVAC and lighting systems in the section of the museum that housed the kitchen. This gave NMAH staff an opportunity to redesign the exhibition, improving display conditions and putting Julia Child and her kitchen into the broader context of American food history. The end result, entitled *FOOD: Transforming the American Table, 1950–2000*, opened in November 2012 and is slated to run until 2017.

2.1 CLASS IN THE KITCHEN

As part of the planning process for the new exhibition, a class of five GWU Museum Studies students spent the Spring 2011 semester working under the supervision of professor and objects conservator, Mary Coughlin, and NMAH curators, primarily Paula Johnson and Steve Velasquez. The class evaluated the condition of the objects in the kitchen and made recommendations to incorporate preventive conservation into the renovated space (fig. 1). Weekly classes were held inside the kitchen in full view of

Fig. 1. Students Amanda Browe, Anneliese Bustillo, Caitlin Dichter, Lauren Andersen, and Christine Klepper with Professor Coughlin inside Julia Child's kitchen. Note young boy peering through the viewport door. (Courtesy of Steve Velasquez)

the public. The students performed basic assessments to identify objects in need of conservation attention, noting condition issues on survey checklists. They also measured temperature, relative humidity (RH), and visible and ultraviolet light levels. They monitored selected plastics for acidic off-gassing using A-D (acid detection) Strips.

A curator stood outside the exhibition when classes were taking place to interact with the public and keep visitors from wandering in. The latter was more of an issue than one would expect as people assumed that if others were allowed in the kitchen, they should be too. Some visitors became so engrossed watching the students that they walked right into the acrylic viewports or pushed against them to get a better view.

A second curator inside the kitchen facilitated entry for the class, making sure the students had nitrile gloves for handling artifacts and that everyone removed their shoes and wore socks to prevent damage to the floor, a paper print mounted on Masonite of the kitchen's original linoleum. The curator also provided supplies to complete the condition surveys, such as extra survey forms, clipboards, and pencils; Volara to protect the kitchen table and countertops that doubled as the class's work surfaces; and Mylar, in case barriers had to be replaced or installed where objects touched each other. By the end of 14 class sessions, the students completed about 400 survey checklists.

In addition to in-class activities, the students were required to write about their experiences for the NMAH blog "O Say Can You See" and submit research papers on materials identified by curators as having potential long-term exhibition issues. These included wooden objects, cast iron pots, artwork on paper and canvas, plastic objects, polyvinyl chloride (PVC) Dymo labels adhered to the wall, and masking tape labels written by Julia herself. The students discussed how Julia used or viewed these objects and made recommendations for their care and display.

3. PLASTICS

During the survey, the students discovered that several of the plastics were not aging well, which was not surprising given the inherent vice common to them. Dishwashing gloves that were originally blue had turned black on exposed surfaces; a PVC-coated dish rack was tacky and off-gassing acids; a bulb baster had become completely rigid; and silicone spatulas were discolored and weeping. Each time a degraded plastic was discovered, a discussion ensued about the potential impact if the object remained on display and if removal would affect the curatorial goal of authenticity.

3.1 SILICONE SPATULAS

An archival image from 1975 of Julia Child in her kitchen may provide insight into how Julia herself may have viewed plastics in her kitchen (fig. 2). The plastic spatulas in the ceramic crocks over the stove are black, olive green, red, and white, and appear to be made of hard plastic. The spatulas accessioned in 2001 do not exactly match those in the earlier image, which is not surprising since an active cook would likely replace plastic spatulas over a 25-year period (fig. 3). Comparison of the two images also shows that Julia utilized new materials. In 2001, a crock labeled "R. Spatulas" (presumably denoting "rubber" spatulas that are likely made of silicone) was part of the accession. There are no silicone spatulas in the 1975 image because they were not commercially available until the late 1980s or early 1990s (Scientific American 2010).

Students assessing objects around the stove noticed a sticky orange substance on several metal spoons in one of the crocks above the stove. The source of this ooze was at first a mystery. The class initially hypothesized that perhaps residues were left on the spoons despite having been cleaned prior to

Fig. 2. Image panel showing Julia in her kitchen in 1975 from *FOOD: Transforming the American Table, 1950–2000.* Note hard plastic spatulas in the crocks above the range. (Courtesy of © Albie Walton 1975—All Rights Reserved)

Fig. 3. Items over range as collected in 2001. Note variety of spatulas made of hard plastic and silicone. The ceramic crocks are labeled with ink on masking tape with descriptors such as "R. Spatulas," "Forkery," and "Spoonery" written by Julia Child. (Courtesy of NMAH)

being shipped from Cambridge, or maybe something from the exhaust vent above the stove was dripping. Neither answer proved satisfying, however, so the students kept surveying surrounding objects while mulling over possible explanations. When they examined the crock next to the metal spoons, they discovered that some of the spatulas were weeping (fig. 4). The exudate was pooling onto the metal spoons in contact with the spatulas and had begun to drip down. The students cleaned the weeping material off the metal, added Mylar to the interior bottom of each crock, and arranged the spoons and spatulas so they were no longer touching. Before installation into the new exhibition, the NMAH objects conservator cleaned the weeping spatulas themselves.

One student devoted her blog entry to the deteriorating silicone spatulas (Andersen 2011), taking on the challenge of presenting this in a way that was accessible to a general audience. She ultimately focused her discussion on inherent vice and the concept that plastics, like other materials, break down over time. To counter potentially negative perceptions, she stressed that a museum professional's job is to manage deterioration and that modern materials such as plastics can present preservation issues for museums.

Fig. 4. Orange weeping material pooled at bottom of silicone spatula. Also note dust stuck to the surface. (Courtesy of NMAH)

3.2 PVC DISH RACK

To the proper right of the sink, below a set of incandescent lights and a row of windows, is a red dish rack (fig. 5). It is composed of a metal wire substrate coated with a red flexible plastic assumed to be PVC based on appearance and typical manufacturing practices (Kingdametal 2013). The red coating is partially worn away, exposing the metal armature, is weeping and tacky in areas (fig. 6), and is off-gassing acidic vapor (see Section 3.5). Objects displayed in the dish rack are protected from the deteriorating plastic by Mylar. Weeping materials have left red streaks where the Mylar has shifted. Quite a bit of dust (an issue in the old exhibition, see Section 4) was stuck to tacky surfaces.

Fig. 5. Red dish rack that is weeping and off-gassing acidic vapor. The items in the rack are isolated with pieces of Mylar at points of contact. (Courtesy of NMAH)

Fig. 6. Detail of dish rack showing streaking on the Mylar from weeping material, missing sections of coating exposing the metal armature, and dust stuck to the tacky surface (Courtesy of NMAH)

The continued display of the deteriorating dish rack took on added complexity in the new exhibition because the kitchen was reoriented to provide visitors with additional views into the kitchen through the windows by the sink. This new vantage point gives a much closer view of many objects, including the dish rack (fig. 7). The class discussed whether the deteriorating dish rack would leave a

Fig. 7. Dish rack as now seen through window in new exhibition (Courtesy of NMAH)

negative impression with visitors or if it was more important for them to see the dish rack that Julia used. In the end, the decision was made to clean the dish rack and cut new Mylar to isolate objects in the rack. The new installation includes a full ceiling over the entire kitchen, which has minimized dust levels overall (see Section 4).

3.3 PHONE BOOK

Julia Child's personal telephone book, a medium-sized spiral binder with indexed pages inside, is displayed exactly where she kept it—on the corner of the counter near the telephone (fig. 8). The phone book's cover is made of an unidentified black plastic. Adhered to the front is a white card that says "Cambridge" and adhered on the back is the Childs' address, telephone, and fax numbers.

In the original display, the phone book was displayed vertically between a nearby wall and a metal pencil sharpener mounted to the countertop. The students created Mylar barriers between the phone book and adjacent surfaces in case the plastic binder started to off-gas or weep in the future. In the new exhibition, the phone book is lying face down on Mylar. This puts less stress on the pages and helps isolate the phone book from other objects if it does begin to degrade in the future.

Fig. 8. Phone book on counter near telephone and Rubik's Cube (Courtesy of NMAH)

3.4 DISHWASHING GLOVES

One of the most surprising material changes the students discovered during the survey was the deterioration of the dishwashing gloves. Stacked atop each other, the gloves had turned black where exposed, but remained blue where protected (figs. 9, 10). This dramatic and previously unknown color change probably resulted from a combination of use, inherent vice, and exposure to the environment. High light levels are an especially likely contributing factor since the gloves have always been directly below two incandescent bulbs and would have also been exposed to natural sunlight coming through the windows in the Childs' home. For the new exhibition, curators reinstalled the gloves with the formerly protected glove facing up to show its blue color (fig. 10).

Fig. 9. Dishwashing gloves as displayed in former exhibition. Note that between the fingers the original blue can be seen while the exposed surfaces have turned black. (Courtesy of NMAH)

Fig. 10. Blue side of dishwashing glove as displayed in new exhibition. The gloves are now isolated with Mylar. (Courtesy of NMAH)

Because the gloves are not aging well, concerns arose that they may become tacky or brittle in the future. Mylar was placed between the two gloves and on the bottom of the lowermost glove to act as a barrier and facilitate future handling (lifting by the Mylar instead of the glove). Because the gloves have noticeably altered over time and are displayed in close proximity to other materials including plastics and metal, they were monitored for acidic off-gassing (see Section 3.5).

A student who chose to write about the plastics for her paper said she would "definitely recommend considering removing the gloves from the kitchen." This reluctance to take a firm stand illustrates the dilemma that can arise between exhibiting and preserving collections, especially plastics. Here, the goal of authentic exhibition took precedence and the gloves remain on display with their original blue color exposed.

3.5 OFF-GASSING PLASTICS

Many plastics off-gas acidic vapors as they age. Though developed for cellulose acetate film, A-D (acid-detecting) Strips from the Image Permanence Institute will react to acids emitted from a range of plastics and other materials. Being acid–base indicators, the strips turn from blue to shades of green to yellow when acidic vapor is present, with yellow indicating a high acid concentration (Image Permanence Institute 2001).

In the class, students chose plastics to monitor, set out A-D Strips, and left them in place for one week. When they compared the exposed strips with an unexposed reference, they found that some plastics were off-gassing acids to varying degrees. These objects were monitored further with new strips to gain additional insights and information. For instance, strips placed with the dish rack turned partially yellow, indicating acidic off-gassing. Additional testing resulted in one strip that turned teal with a light green line and another that turned green with yellow edges, confirming the initial results.

The A-D Strips used to monitor the dishwashing gloves turned yellow, a strong positive, and there was concern about how far the acid vapor was dispersing. Another strip was placed adjacent to but not touching the gloves. After one week, the strip turned a lighter blue/green, indicating that though some acidic vapor is spreading, the highest concentration is directly at the gloves themselves. The gloves and other plastic-based materials will continue to be monitored in the future to determine if they are off-gassing, how far the acidic vapor is spreading, and if they are negatively impacting other materials in the kitchen.

4. DUST ISSUES

The old exhibition had a serious dust problem. Walls, acrylic viewports, and a door kept visitors from stepping into the kitchen. However, the enclosures did not extend to the ceiling, and this, combined with air vents above the exhibit space and high visitor numbers, resulted in significant dust deposition.

Exacerbating the issue, some of the plastics were tacky, particularly the red dish rack, a few of the silicone spatulas, and a PVC tablecloth. The tackiness, likely the result of plasticizers and other components leaching out, caused dust to stick to the objects, sometimes in very visible clumps. Even though the curatorial division would perform routine surface cleaning, the dust was very difficult to remove from the tacky plastics and would quickly redeposit. The dust was adhered so strongly that the NMAH objects conservator had to clean the objects before they could be reinstalled in the new display. The realization that dust was a major problem helped convince NMAH curators and designers that the new exhibition must have a closed ceiling. When it was suggested that this feature be cut to save money, the curators and conservators stoutly protested. In the long run, this will likely prove to be one of the most influential preservation decisions.

Fig. 11. Viewport door of the kitchen at the entrance/exit of *FOOD: Transforming the American Table, 1950–2000.* A lack of gaskets around the door allows dust to enter. (Courtesy of Mary Coughlin)

When the kitchen was reevaluated for preventive conservation measures in April 2013, it was found that the dust deposition was indeed much lower. The exhibition had been periodically spot-cleaned since installation in November 2012 and over that nearly 6-month period, very little dust accumulated. One exception was along the glass entry door, which has a large gap at the bottom. Because the door is situated at the start of the exhibition, all visitors pass by it as they enter and exit (fig. 11) the larger gallery space, shedding and redistributing dust that can then get in through the gap. A quick swipe of two Swiffer cloths near the door showed the degree to which dust had entered, especially when compared to other areas of the kitchen. Adding gaskets to the door to better seal the opening would effectively solve this issue.

5. TEMPERATURE AND RELATIVE HUMIDITY

A digital hygro-thermometer was placed in the kitchen to record the temperature and RH at the start and end of each two-hour class. Generally, temperature readings increased by 2°F over each month going from an average of 72°F at the start of the semester to 76°F at the end. The largest temperature increase measured over the two-hour class interval was 2.4°F, which was on the same day in April that the highest temperature was reached (76.4°F). This was likely due to a combination of seven people being inside the

kitchen, warmer spring weather, and greater visitor numbers outside the exhibition (keeping in mind the partial walls and open ceiling that exposed the exhibit to the larger gallery). The RH reached a low of 36% in February but steadied in March and April between 42% and 45%.

The same digital hygro-thermometer used during the class was used during the 2013 re-evaluation of the renovated exhibit. The museum had not yet opened to the public for the day and there were two to three people in and out of the kitchen while the readings were taken. Over a two-hour time period, the temperature was between 69.8°F and 71.6°F and the RH stayed at 37%. The lower readings could be the result of HVAC renovations and a better sealed display; it might have increased as visitors entered the museum. Additional, longer-term monitoring of the temperature and RH would give a fuller sense of the environment in the new exhibition space.

6. VISIBLE AND ULTRAVIOLET LIGHT

The GWU students monitored visible and ultraviolet light levels throughout the kitchen, taking a total of 47 light readings. They recorded the readings in an Excel spreadsheet and noted the object measured, its location, major materials present, and whether visible light levels were appropriate or not. Students only commented on visible light because the UV light levels were consistently low in the 0–1 milliwatts/square meter range.

Of the objects monitored, 19 were being exposed to inappropriate visible light levels. The objects included paper, wood, and plastics that had light levels ranging from 54 lux on a book cover to 1100 lux on wooden knife handles.

In 2013, light level readings were again taken in the kitchen with the hope that the new exhibition space, which appears darker, would equate to improved readings for the objects previously lit at inappropriately high visible light levels. Some improvements are evident, particularly in the section of countertop where the telephone, phone book, and Rubik's Cube are located (fig. 8). Visible light levels in that corner went from the 38–140 lux range down to 14–26 lux, and the various plastics, papers, and inks these objects are composed of should benefit from the decrease.

Mounted to the wall on either side of the sink is a pair of lights each with two incandescent bulbs pointing downward (fig. 12). These lights, which are original to the kitchen, create hot spots on the materials directly below them. This puts the dish rack (measured at 211–214 lux), the dishwashing gloves (215–242 lux), and the wooden handles of the wall-mounted knives (460–1246 lux) at risk.

Light levels are also a concern over the range where there are degrading plastic spatulas and fading ink on Julia's hand-written crock labels (fig. 3). Here, visible light levels range from 40 to 310 lux. The labels are in the 40–60 lux range, which is within or close to the 50 lux or less recommendation for sensitive materials on exhibit. However, the duration of the exhibition has to be considered when evaluating cumulative light damage as well as the fact that the labels were already on display for 10 years and at much higher light levels (measured at 48–181 lux in 2011).

Light reduction is complicated by the restraints of the exhibit design. Lower light levels would make details harder to see in areas where objects must be viewed from a distance, such as over the range where the only head-on view is from the other side of the kitchen. Correcting hot spots may conflict with the goal to stay true to the kitchen's original layout, particularly by the sink where the original lights are still in use. The curators designing the exhibit had to ask whether replacing the incandescent bulbs with modern bulbs such as LED would compromise the authenticity of the kitchen. If a visitor got a glimpse of a newer bulb, would their experience be impacted? Could this be mitigated by using LED bulbs that look like incandescent bulbs? What compromises can be made to preserve the collections while holding on to the driving tenet to display the kitchen exactly as collected?

Fig. 12. Incandescent lights on either side of the sink create hot spots on organic and plastic objects including the dish rack and dishwashing gloves. (Courtesy of NMAH)

7. CONCLUSION

The plastics on display in Julia Child's kitchen provide examples of the issues that will be faced more and more as contemporary objects made of plastics enter museums. Curators, conservators, collections managers, designers, and others will have to make difficult decisions about whether the primary goal of plastics in museum collections should be preservation or exhibition. If objects are collected to be seen and studied, then is it okay to do that even when they start to deteriorate? Once plastic degradation starts, the deterioration can be rapid, so does that make it more imperative to show the objects now while it is still an option? Does it depend on the specific object? What is the public's role in this discussion? Is the visitors' experience or understanding impacted by reproductions or could the display of degrading materials serve as an added layer of education?

For the display of Julia Child's kitchen, the continued exhibition of degrading plastics seems to be having minimal impact on other materials nearby. However, it is as real possibility that in the future some of these plastics will start to have more deleterious issues and may need to be taken off of view. Though decisions to display or not to display are usually settled before new exhibitions open, NMAH staff realize that the need to monitor the condition of the plastics and periodically address their ability to be exhibited will continue for as long as visitors can come see the kitchen.

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Image Permanence Institute
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