

**“EYE APPEAL IS BUY APPEAL”:  
BUSINESS CREATES THE COLOR OF FOODS, 1870-1970**

by

Ai Hisano

A dissertation submitted to the Faculty of the University of Delaware in partial fulfillment of the requirements for the degree of Doctor of Philosophy in History

Spring 2016

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## ACKNOWLEDGMENTS

I owe my gratitude to all those people who have made this dissertation possible. My deepest gratitude is to my advisor, Dr. Susan Strasser. Her encouragement and commitment to her students taught me how to be a great scholar and mentor. Her critical comments on my numerous drafts and challenging questions not only made my writing clearer but also guided me to explore new directions and think harder. Her patience and support helped me overcome many difficult situations and finish this dissertation. Our monthly meeting at the Library of Congress cafeteria, during the 2014-2015 academic year, will always remain a cherished memory with me. I am also thankful to Dr. David Suisman for sincere encouragement and support throughout my graduate studies. Conversations with Dr. Roger Horowitz at different stages of my research were always thought-provoking and helped me organize thoughts and express ideas. Dr. Warren Belasco's insightful comments on my work, as well as his numerous books on food history, provided me with new ways of thinking about foods. I feel very privileged to have these distinguished scholars and mentors on my dissertation committee. Their generous support and encouragement helped me complete the dissertation.

I am also deeply grateful to faculty members and graduate students in the Department of History at the University of Delaware, including Dr. Anne Boylan, Dr. Arwen Mohun, Dr. Adam Rome, Liz Jones, Jennifer Jensen, Alison Kreizer, and Satomi Minowa. Jennifer Fang deserves more thanks than I can ever give. She read, among other drafts and papers, very first, rough drafts of every single dissertation

chapter. Her thoughtful comments, encouragement, and friendship made my graduate experience a wonderful memory that I will cherish forever.

My journey to graduate school started when I was at the University of Tokyo in Japan. I owe great many thanks to my long-time mentor Dr. Yujin Yaguchi. He introduced me to the depth and breadth of historical studies and led me to pursue academic career. Without him, I would never have imagined to be a historian. My fellow graduate students at the University of Tokyo also helped me develop my project, asking me many interesting questions and giving me suggestions.

I am indebted to generous support from various institutions for conducting research and writing my dissertation. The two-year Fulbright Graduate Study Grant enabled me to proceed to graduate study in the United States. I am also grateful for the four years of support from the University of Delaware. The Henry Belin du Pont Research Grant from the Hagley Museum and Library and the John Furr Fellowship for JWT Research from the John W. Hartman Center at Duke University supported my research on advertisements and corporate records. Two fellowships from the Smithsonian Institute allowed me to gather substantial resources at the National Museum of American History, the Library of Congress, and the National Archives.

I owe a great debt to the librarians and archivists who provided me with access to numerous documents. Their knowledge about collections and insights into different fields of study also enriched my project and helped me to ask new questions. I am grateful for enormous assistance from Paula Johnson, Eric Hintz, Alison Oswald, Joe Hursey, Deborah Warner, and Jim Roan at the National Museum of American History. I thank Paul Doucette at the Southborough Historical Society; Jim Cusick and Carl Van Ness at the University of Florida; LuAnn Mims at the Florida Southern College;

John Skarstad at the University of California-Davis; Elizabeth Brake and Lynn Eaton at Duke University; and the staff at the Schlesinger Library at Harvard and at the University of Delaware library.

This dissertation would not have been possible without support from my family. My parents have always provided me with sincere and bottomless encouragement and support. This dissertation is dedicated to my partner Yuki Oda. His patience, encouragement, and confidence in me always assured me that I would finish the dissertation and what I was doing was meaningful. He makes everything better and my life colorful.

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## **ABSTRACT**

This dissertation examines the American food industry's persistent attention to color from the late nineteenth to the mid-twentieth century. In the late nineteenth century, producers, retailers, and intermediate suppliers began devoting enormous resources to determine and create the "right" color of foods, which many consumers would recognize and in time take for granted. This initiative to manipulate the color of foods involved large sectors of the U.S. economy, creating new business partners and networks among different industries. The management of food color also transformed merchandising systems and the ways products were presented to consumers. The dissertation illustrates these complex – and colorful – processes, implemented by various agents, including dye makers, food processors, farmers, grocers, advertising agents, and government agencies. While firms influenced and propagated public perception about the "natural" color of foods, consumers' strong, sometimes stubborn, notions about how food should look in turn affected corporate activities. Government policies on food safety stimulated the integration of color manipulation into food businesses by regulating, and encouraging, the industry's color control practices.

The dissertation explores how administrators, scientists, and corporate managers, across the realms of politics and business, constructed and conceptualized the color of foods. I trace the place of color in the discussion of food purity and adulteration, the development of food engineering, and the transformation of food marketing and merchandising systems from the Progressive era to the Post-World War II period. At the turn of the twentieth century, the invention of synthetic dyes and



innovations in packaging and retailing technology transformed the function of color for food businesses. Color-controlling technologies afforded manufacturers and retailers new ways of coloring foods economically, consistently, and conveniently, allowing for a new level of control and standardization. As the labor and technology involved in manipulating food color changed, food companies utilized color as a marker of consistent quality and brand identity that would appeal to consumers' eyes in the market transaction.

To assess how color became the dominant means of presenting and understanding food quality, the dissertation analyzes how various agents manipulated the color of foods at different stages of food chains from production, transportation, and retailing to home consumption. By examining the color of agricultural produce as an indicator of naturalness, freshness, and ripeness, I demonstrate that dynamic relations between culture, ecology, and economy created the color of foods, which many consumers considered “natural.” I also investigate how firms created and presented, as well as constructed the mass market for, processed foods, including canned and frozen foods, that consumers had never before seen or eaten. As mass-produced foods flooded into the American kitchen in the mid-twentieth century, food companies promoted colorful dishes, such as Jell-O and decorated cakes, as a way for women to express their aesthetic tastes. In highlighting ideologies about gender and industrialization embedded in narratives about food coloring in the household, I examine how ideas about purity and artificiality became closely intertwined in mass consumer culture.

## INTRODUCTION

“We do our gardening in the grocery or delicatessen, and in our selection of foods odor and taste have taken an inferior place to sight,” a color scientist in the U.S. Department of Agriculture (USDA) noted in 1929, in the trade journal *Food Industries*.<sup>1</sup> In emphasizing fundamental changes in food retailing and purchasing, he argued that consumers judged and selected food products based primarily on what they *saw* at the store. Ten years later, another USDA chemist asserted that color was a kind of “yardstick” in the selection and judgment of foods:

Doubtless this eye appeal depends in good part upon the appeal of the color of the food by association through our sense of sight to our memory. Hence, to gain this eye appeal the color of a given food must be normal and right.<sup>2</sup>

His emphasis on the “normal and right” color of foods suggests that memory and the sense of sight were not simply personal sensations or perceptions; rather, the visual modality was a shared experience that could be normalized and standardized. These government scientists who specialized in food color research not only encouraged but also served to authorize food producers and retailers to attend to and control the color of foods.

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<sup>1</sup> Horace T. Herrick, “Food Colors Increase Attractiveness in Harmless Fashion,” *Food Industries* 1, no. 14 (November 1929): 659. See also “Color in Food,” *Food Industries* 1, no. 15 (December 1929): 721.

<sup>2</sup> B. I. Masurovsky, “How to Obtain the Right Food Color,” *Food Industries* 11, no. 1 (January 1939): 13.

Today, the manipulation of food color has become much more sophisticated than eighty years ago when the USDA scientists observed the transformation of the visual environment in food stores. Consumers cannot escape from uniformly colored, bright foods, carefully engineered by producers and retailers, in almost any aisle of a grocery store. Even the color we think of as “natural” is a product of manipulation. Agricultural producers and packers create and maintain the color of fruits and vegetables by controlling their ripening processes. Refrigerated display cases, store lighting, and transparent packages are all essential for retailers to retain and present the appetizing “fresh” color of produce and meat. Many dairy producers color butter and cheese with yellow dyes. Food processors add enormous amounts of dyes to snacks, candies, and other packaged products.

This manipulation of food color is a business practice often invisible to consumers. Yet it has been an indispensable part of the expansion of the agricultural and food industries. Despite the crucial importance of color to the food industry and to people’s everyday lives, historians have not fully investigated the place of color in food businesses. This dissertation unpacks this untold history about the construction of visibility in food production, marketing, and consumption, in the United States.

The cultural and commercial importance of color is not exceptionally American. In many cultures, food color has been associated with aesthetic presentation, religious beliefs, social status, and freshness and ripeness.<sup>3</sup> Yet how,

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<sup>3</sup> See Mary Douglas, “Food as a System of Communications,” in *In the Active Voice* (Boston: Routledge & Kegan Paul, 1982), 82-124, particularly the section “Food as Art Form”; Susanne Freidberg, *Fresh: A Perishable History* (Cambridge, MA: Belknap Press of Harvard University Press, 2009); John B. Hutchings, *Expectations and the Food Industry: The Impact of Color and Appearance* (New York: Kluwer Academic/Plenum, 2003); John B. Hutchings, *Food Color and Appearance*, 2nd ed.

why, and to what extent American producers and retailers manipulated the color of foods depended on particular political, economic, technological, environmental, and cultural conditions in the United States. What consumers considered as the “natural” color of foods was also a product of ecological, economic, and cultural factors. Government regulation on food coloring, for instance, restricted the kinds of food dyes producers could use. Global and domestic market competition and available technologies helped expand, and sometimes limited, producers’ color manipulation practices. Climate and other environmental conditions were critical factors that determined the quality of agricultural produce harvested in certain regions, affecting how growers controlled the color of their products. Shifting consumer conceptions about the safety and wholesomeness of foods had a strong impact on manufacturers’ business decisions on food color control. The history of dye manufacturing, food regulation, and food coloring practices allows us to see (to use a visual metaphor) the

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(Gaithersburg, MD: Aspen, 1999); and Maguelonne Toussaint-Samat, *A History of Food*, trans. Anthea Bell (Cambridge, MA: Blackwell, 1992). For the cultural and historical analysis of color in general, see Regina Lee Blaszczyk, *The Color Revolution* (Cambridge, MA: MIT Press, 2012); Peter John Brownlee, “Color Theory and the Perception of Art,” *American Art* 23, no. 2 (Summer 2009): 21-24; Jonathan Cohen and Mohan Matthen, ed., *Color Ontology and Color Science* (Cambridge, MA: MIT Press, 2010); Joann Eckstut and Arielle Eckstut, *The Secret Language of Color* (New York: Black Dog and Leventhal, 2013); John Gage, *Color and Meaning: Art, Science and Symbolism* (Berkeley: University of California Press, 1999); Amy Butler Greenfield, *A Perfect Red: Empire, Espionage, and the Quest for the Color of Desire* (New York: Harper Collins, 2005); Trevor Lamb and Janine Bourriau, eds., *Colour: Art & Science* (New York: Cambridge University Press, 1995); David MacDougall, “The Experience of Color,” *Senses and Society* 2, no. 1 (2007): 5-26; Michel Pastoureau, *Black: The History of Color* (Princeton: Princeton University Press, 2008); and Michael Taussig, *What Color is the Sacred?* (Chicago: University of Chicago Press, 2010).

creation of new industry networks and business activities, as well as the transformation of how and what consumers expected in the United States.

The manipulation of food color is not a modern development but has been a common practice across cultures for millennia, at least since ancient Egyptians used saffron to color foods. In Ancient Egypt, saffron was an important trading commodity mainly from Asia. It was almost literally worth its weight in gold. In many regions, its golden color signified enlightenment, illumination, and knowledge.<sup>4</sup> Due to its economic and cultural significance, the use of saffron, as well as foods colored with it, often indicated wealth and wisdom.<sup>5</sup> Until the late nineteenth century, like saffron, plant-derived, so-called natural dyes, had been the major source of coloring foods for food producers and consumers in many parts of the world.

At the turn of the twentieth century, the industrialization of food processing and agriculture and the transformation of eating habits dramatically changed the function of color, in food businesses as well as in the American diet. For many food companies, the manipulation of color became a significant means for disguising deterioration, making food look “natural” and “fresh,” and distinguishing one brand from others. In the household, packaged food dyes enabled consumers to color dishes without time-consuming processes, such as extracting fruit and vegetable juices. Food color thus became a central concern of food companies and offered consumers creative opportunities for cooking food at home.

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<sup>4</sup> Toussaint-Samat, *A History of Food*, 518-19.

<sup>5</sup> Ibid., 520.

This dissertation illustrates the food industry's persistent attention to color from the late nineteenth to the mid-twentieth century. I argue that the color that Americans today associate with certain foods is the product of economic, political, and cultural negotiations among agricultural producers, food processors, government officials, dye makers, consumers, and large non-food companies like DuPont and General Electric. During the late nineteenth century, producers, retailers, and intermediate suppliers began devoting enormous resources to determine and create the “right” color of foods, which many consumers would recognize and in time take for granted. The management of color also transformed merchandising systems and the ways foods were presented to consumers. The dissertation examines these complex – and colorful – processes, implemented by various agents.

Legislators, scientists, and corporate managers, across the realms of politics and business, constructed and propagated an idea that visibility, particularly color, was one of the most important factors in selling foods. By focusing on government regulations on food coloring, color manipulation and presentation of foods by industry, and consumer expectations, I trace the place of color in the discussion about food purity and adulteration, the development of food engineering, and the rise of mass-consumer culture from the Progressive Era to the post-World War II period. I aim to show how the invention and innovation of color controlling technologies, such as synthetic food dyes, ethylene gas, and clear packaging, as well as the expansion of the food processing industry, transformed a dominant worldview concerning food and nature in the twentieth-century United States.

Technological and scientific development in food coloring and color science, and the transformation of food purchasing patterns in the early- to mid-twentieth

century, enabled producers and retailers to control what and how consumers saw foods in retail stores and in households. Color-controlling technologies afforded producers and retailers new ways of coloring foods economically, consistently, and conveniently, allowing for a new level of control and standardization. Synthetic dyes, for instance, were more intense in hue and less likely to fade compared to natural dyes extracted from plants. Food manufacturers utilized color as a marker of consistent quality that would appeal to consumers' eyes in the market transaction.

Modern food retailing in self-service stores transformed the food shopping experience into something that relied almost entirely on the sense of sight. The color of foods was, and is, a visual communication that not only appealed to the eyes of consumers but also stimulated gustatory, olfactory, and tactile sensation. Color conveyed sensory knowledge that consumers understood, and helped them imagine the taste, smell, and texture of a product. In self-service supermarkets, where consumers rarely had a chance to actually eat, smell, or touch pre-packaged food products, they learned to discern the various traits of food by looking at its appearance. Color served as a barometer for consumers to evaluate product quality, determining the acceptability of food. As visual appeal became highly important in food merchandising, producers and retailers manipulated and presented the color of foods to convey standardized ideas about goodness, naturalness, and freshness of foods.

Color was generally easier to control, reproduce, and commoditize than other sensory factors. The smell of foods, for instance, was difficult to advertise in print media or television. In contrast, color served as a powerful communication tool for the food industry. The bright, uniform color of foods and visually appealing retail stores

offered consumers new kinds of food buying and eating experiences while constructing and standardizing consumer expectations about the color of foods.

Film studies scholar Joshua Yumibe has shown that the increase of colored goods and media, as well as the development of color theory, had a fundamental impact on modernity. By the early twentieth century, “color was pouring into all facets of modern life” – advertisements, street signs, textile, art, and foods.<sup>6</sup> As Yumibe points out, the development of more economical synthetic dyes was indispensable for manufacturers to produce various goods, creating color-saturated mass culture.<sup>7</sup> After British chemist William Henry Perkin succeeded in processing the first synthetic dye in 1856, many dye manufacturers began expanding the palette of synthetic colors.<sup>8</sup> Historian Warren Susman noted that “chemically produced colors made possible a world of color never seen before.”<sup>9</sup> By investigating how food businesses capitalized on color, this dissertation delineates the history of new kinds of visuality that food producers and retailers created.

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<sup>6</sup> Joshua Yumibe, *Moving Color: Early Film, Mass Culture, Modernism* (New Brunswick, NJ: Rutgers University Press, 2012), 17. See also Neil Harris, *Cultural Excursions: Marketing Appetites and Cultural Tastes in Modern America* (Chicago: University of Chicago Press, 1990).

<sup>7</sup> Yumibe, *Moving Color*, 25-26.

<sup>8</sup> For the history of colorants, see Jordanna Bailkin, “Indian Yellow: Making and Breaking the Imperial Palette,” *Journal of Material Culture* 10 (2005): 197-214; Philip Ball, *Bright Earth: Art and the Invention of Color* (Chicago: University of Chicago Press, 2003), 147-67 and 197-230; Greenfield, *Perfect Red*; and Esther Leslie, *Synthetic Worlds: Nature, Art, and the Chemical Industry* (London: Reaktion Books, 2005).

<sup>9</sup> Warren Susman, *Culture as History: The Transformation of American Society in the Twentieth Century* (Washington, D.C.: Smithsonian Institution Press, 2003), xxv.



## Significance and Literature Review

The literature on food color has been written mainly by practitioners: scientists in agriculture and food science departments in universities, public institutions, and corporate laboratories. While their studies have demonstrated the physiological and psychological impact of color on taste, they generally neglect historical and cultural aspects of both color and food.<sup>10</sup> The few studies conducted by historians and sociologists have mainly focused on color additives in the context of the pure food movement of the early twentieth century and the establishment of the 1906 Pure Food and Drug Act. Many historical studies about food coloring regulations have interpreted scientists and regulators in the Food and Drug Administration, especially Harvey Wiley – a key figure in the passage of the 1906 act – as champions of public welfare, and corporate leaders as profit-seeking robber-barons.<sup>11</sup> In criticizing the focus on “public interest,” historian Gabriel Kolko argued that the government was

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<sup>10</sup> See for instance Catherine A. Culver and Ronald E. Wrolstad, eds., *Color Quality of Fresh and Processed Foods* (Washington, D.C.: American Chemical Society, 2008); Alison Downham and Paul Collins, “Coloring Our Foods in the Last and Next Millennium,” *International Journal of Food Science and Technology* 35 (2000): 5-22; Gordon Mackinney and Angela C. Little, *Color of Foods* (Westport, CT: AVI, 1962); Rose M. Pangborn, “Influence of Color on the Discrimination of Sweetness,” *American Journal of Psychology* 73, no. 2 (June 1960): 229-38; R. A. Quevedo, J. M. Aguilera, and F. Pedreschi, “Color of Salmon Fillets by Computer Vision and Sensory Panel,” *Food Bioprocess Technology* 3 (2010): 637-43; Charles Spence et al., “Does Food Color Influence Taste and Flavor Perception in Humans?” *Chemosensory Perception* 3, no. 1 (March 2010): 68-84; and Christopher Strugnell, “Color and its Role in Sweetness Perception,” *Appetite* 28, no. 1 (1997): 85.

<sup>11</sup> Oscar E. Anderson, *The Health of the Nation: Harvey W. Wiley and the Fight for Pure Food* (Chicago: The University of Chicago Press, 1958); and Lorine Swainston Goodwin, *The Pure Food, Drink and Drug Crusaders, 1879-1914* (Jefferson, NC: McFarland, 1999). For a historiographical overview on the relationships between government and industry, see Thomas K. McCraw, “Regulation in America: A Review Article,” *Business History Review* 49, no. 2 (Summer 1975): 159-83.

“captured” by big business who supported and promoted the passage of food regulation to protect their vested interests and eliminate their small business competitors.<sup>12</sup> Both the “public interest” and “capture” theories tend to view government and industry as monolithic entities.

This dissertation challenges this binary view of government and industry. It asserts that relationships between the state and industry were dynamic, and government agents and corporate managers held various interests and objectives. In *The Politics of Nature*, Clayton Coppin and Jack High explain the 1906 act as a law that regulated corporate competition. The authors analyze the role of Wiley as a collaborator with firms, which benefited from his enforcement of the pure food law, rather than as a champion of purity and public welfare.<sup>13</sup> In drawing on their argument, I demonstrate that federal and state regulations helped sustain and expand food coloring businesses, rather than working against corporate interests. Government served not only to regulate the food and dye industries but also to create the new market for food dyes. Government officials and scientists also played an important role in standardizing, legitimizing, and naturalizing ideas about how food should look by initiating food and dye research, establishing grade standards, and providing legislative definitions of foods.

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<sup>12</sup> Gabriel Kolko, *The Triumph of Conservatism: A Reinterpretation of American History, 1900-1916* (New York: 1963).

<sup>13</sup> Clayton A. Coppin and Jack High, *The Politics of Purity: Harvey Washington Wiley and the Origins of Federal Food Policy* (Ann Arbor: The University of Michigan Press, 1999), 4-5.

To analyze the political, economic, and cultural significance of color in the food business in the twentieth-century United States, I draw on studies that have shown the close and complex relationships between the state and industry, as well as the role of various agents in constructing American capitalism. Such historians as Martin Sklar, Jackson Lears, and Lizabeth Cohen have illuminated the significance of corporate capitalism in restructuring American politics, the cultural consequences of modern advertising, and the construction of American economy, culture, and politics in mass-consumer society.<sup>14</sup> They provide a critical framework for investigating how food coloring regulations, innovations in food engineering, and the development of food marketing strategies constructed and propagated knowledge about the color of foods that conveyed information about food quality and consumers' taste for the culinary art.

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<sup>14</sup> Lizabeth Cohen, *A Consumers' Republic: The Politics of Mass Consumption in Postwar America* (New York: Vintage Books, 2003); Jackson Lears, *Fables of Abundance: A Cultural History of Advertising in America* (New York: Basic Books, 1994); and Martin J. Sklar, *The Corporate Reconstruction of American Capitalism, 1890-1916: The Market, the Law, and Politics* (New York: Cambridge University Press, 1988). See also Thomas Frank, *The Conquest of Cool: Business Culture, Counterculture, and the Rise of Hip Consumerism* (Chicago: University of Chicago Press, 1997); Louis Galambos and Joseph Pratt, *The Rise of the Corporate Commonwealth: U.S. Business and Public Policy in the Twentieth Century* (New York: Basic Books, 1988); Lawrence B. Glickman, *Buying Power: A History of Consumer Activism in America* (Chicago: University of Chicago Press, 2009); Geoffrey Jones, *Beauty Imagined: A History of the Global Beauty Industry* (New York: Oxford University Press, 2010); Thomas K. McCraw, ed., *Creating Modern Capitalism: How Entrepreneurs, Companies, and Countries Triumphed in Three Industrial Revolutions* (Cambridge, MA: Harvard University Press); Susan Strasser, *Satisfaction Guaranteed: The Making of the American Mass Market* (New York: Random House, 1989); and David Suisman, *Selling Sound: The Commercial Revolution in American Music* (Cambridge, MA: Harvard University Press, 2012).

Examination of the food dye industry adds a significant perspective to the history of mass production and mass marketing. The growth of food dye companies generally followed the evolutionary path of big businesses that historians, most notably Alfred Chandler Jr., have shown: many dye makers started as relatively small family businesses and grew into giant manufacturers through successful corporate mergers. Chandler also explored the growth of the food industry by focusing on the increase of production in scale and scope, the development of mass-marketing, and the transformation of organizational structure.<sup>15</sup> But such a model alone does not fully explain the expansion of food coloring businesses or its significance for the food industry and for consumption.

I seek to link manufacturing and corporate marketing with business competition, government regulation, and broader trends in consumption. In so doing, the dissertation elucidates the social and cultural implications of technological development and economic changes, specifically in the chemical industry. The early manufacturing of food colorings in the United States was part of the development of the chemical industry at the turn of the twentieth century. Firms – particularly National Aniline & Chemical Company, Heller & Merz Company, and H. Kohnstamm & Company – manufactured food dyes and sold them to food and beverage companies. Trans-Atlantic political economy and technological transfers in the global dye industry helped expand these American food coloring businesses. Historians of

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<sup>15</sup> Alfred Chandler, Jr., *Scale and Scope: The Dynamics of Industrial Capitalism* (Cambridge, MA: Harvard University Press, 1994); and Chandler, *The Visible Hand: The Managerial Revolution in American Business* (Cambridge, MA: Harvard University Press, 1977).

the chemical industry have described in detail the increasing connections between science and industry, the role of research and development divisions, and the institutionalization of scientific research.<sup>16</sup> No scholar of the dye industry, however, has fully explored the inter-industrial relations between dye makers and other industries such as food or specifically the history of the food dye business. Nor have they emphasized the social and cultural significance of dyes.

While building on the history of the chemical industry, this dissertation breaks from a narrative that centers primarily on technological development. It asks, instead, what happened after the invention and development of synthetic dyes: what were the consequences of dye development for food production and marketing? Who used commercially produced dyes? How did the state, the food industry, and consumers respond to them? What influence did commercial dyes have on consumer perceptions about the “right” colors of individual foods?

In examining the impact of color-controlling technologies on food marketing and on cultural expectations about how food should look, the dissertation illuminates not only the connections between the dye and food industries but also the crucial role

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<sup>16</sup> See for instance John J. Beer, *The Emergence of the German Dye Industry* (Urbana: University of Illinois Press, 1959); L. F. Haber, *The Chemical Industry, 1900-1930: International Growth and Technological Change* (Oxford: Clarendon Press, 1971); Ernst Homburg, “The Influence of Demand on the Emergence of the Dye Industry: The Roles of Chemists and Colourists,” *Journal of the Society of Dyers and Colourists* 99, no. 11 (November 1983): 325-33; Kathryn Steen, *The American Synthetic Organic Chemical Industry: War and Politics, 1910-1930* (Chapel Hill: University of North Carolina Press, 2014); Anthony S. Travis, *Dyes Made in America, 1915-1980: The Calco Chemical Company, American Cyanamid and the Raritan River* (Jerusalem: Edelstein Center/Hexagon Press, 2004); and Travis, *The Rainbow Makers: The Origins of the Synthetic Dyestuffs Industry in Western Europe* (Bethlehem, PA: Lehigh University Press, 1993).

of intermediate suppliers, including DuPont and General Electric, in creating vision-centered food purchasing experiences for consumers. DuPont produced and supplied cellophane, which helped food producers and retailers prolong the shelf-life of foods and display their fresh color. General Electric manufactured lighting equipment developed specifically for food display. Since the perception of color depended on the reflection and intensity of the light, better lighting equipment not only made the entire store brighter but also the color of products more vivid to consumers' eyes, creating appetizing appearance.

By analyzing the commercial importance of color for food production and retailing, my dissertation adds fresh insights to the study of marketing in consumer capitalism. Business historians have shown that intensive advertising, branding, and product choice were major characteristics in the emergence of the consumer goods and service sectors in the late nineteenth and early twentieth centuries. In particular, historians of consumer culture have explored how an increasing number of firms began to capitalize on color for various commodities, such as clothes and automobiles, in the early-twentieth-century United States. Roland Marchand described how color served to convert utilitarian products into fashionable goods with several variations.<sup>17</sup> William Leach saw the “new splash of color and lights” in store windows and department stores as a sign of a “new world of goods.” He also traced the emergence of color-related professions, including marketing consultants on color, such as Faber

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<sup>17</sup> Roland Marchand, *Advertising the American Dream: Making Way for Modernity, 1920-1940* (Berkeley: University of California Press, 1985): 120-27.

Birren.<sup>18</sup> Communications scholar Charlene Elliott has provided a model for analyzing the color of consumer products from a marketing standpoint, though neither her question nor her analysis is historical.<sup>19</sup> Regina Lee Blaszczyk's studies on color have revealed not only the production and marketing of dyes in the textile and automobile industries but also the transformation of the visual environment in American society.<sup>20</sup> These studies have illustrated the significance of the "color revolution" in marketing and retailing of consumer goods mainly in the early twentieth century.

Unlike some other products, however, the color of foods cannot be understood solely as an indicator of abundant varieties or consumer choices. While artificial dyes provided both the food industry and the household with a wide palette of food colors at the turn of the twentieth century, the appearance of food played a different role than the look of other consumer products for which color variety was a crucial element of brand identity and successful marketing. The calibration of food color was essential not only to satisfy, or create, consumers' insatiable appetite by expanding product

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<sup>18</sup> William Leach, *Land of Desire: Merchants, Power, and the Rise of a New American Culture* (New York: Pantheon, 1993).

<sup>19</sup> Charlene Elliott, "Color Codification: Law, Culture and the Hue of Communication," *Journal for Cultural Research* 7, no. 3 (2003): 297-319; Elliott, "Crayoning Culture: The 'Colour Elite' and the Commercial Nature of Colour Standardization," *Canadian Review of American Studies* 33, no. 1 (2003): 37-59; Elliott, "Regimes of Vision and Products of Color," *Senses and Society* 2, no. 1 (2007); and Elliott, "Taste<sup>TM</sup>: Interrogating Food, Law, and Color," *Senses and Society* 7, no. 3 (2012): 276-88.

<sup>20</sup> Blaszczyk, *The Color Revolution*; Blaszczyk, "True Blue: DuPont and the Color Revolution," *Chemical Heritage Magazine* 25, no. 3 (Fall 2007): 20-25. See also Sandy Clarke, "Managing Design: The Art and Colour Section at General Motors," *Journal of Design History* 12, no. 1 (1999): 65-79; and Stephen Eskilson, "Color and Consumption," *Design Issues* 18, no. 2 (Spring 2002): 17-29.

variety but also to “correct” natural variations and convey standardized ideas of freshness and naturalness. Consumers usually considered the color of perishable produce as natural and did not expect, or accept, a new or unique colors for fruits and vegetables, although food manufacturers designed the color of some processed foods, such as breakfast cereals and candies, to show their variation, novelty, and uniqueness.

Producers’ desires to create sustained profits and streamline production, and changing consumer expectations about the color of foods, created the “natural” color of foods as a hybrid of nature and technology, constructing *naturalness* as a complex characteristic of foods. A number of scholars have argued that the natural environment has been constructed as a hybrid between nature and culture. Environmental historian Donald Worster called a domesticated ecosystem an “agroecosystem”; historian Donna Haraway used the term “artifactual nature” to explain a hybrid landscape.<sup>21</sup> In

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<sup>21</sup> Donna Haraway, “The Promises of Monsters: A Regenerative Politics for Inappropriate/d Others,” in *Cultural Studies*, eds. Lawrence Grossberg, Cary Nelson, and Paula Treichler (New York: Routledge, 1992): 295-337; and Donald Worster, “Transformations of the Earth: Toward an Agroecological Perspective in History,” *Journal of American History* 76, no. 4 (March 1990): 1087-1106. For historical studies on hybridity and on the close relationships between nature and culture, see also William Cronon, *Nature’s Metropolis: Chicago and the Great West* (New York: W. W. Norton, 1991); Deborah K. Fitzgerald, *The Business of Breeding: Hybrid Corn in Illinois, 1890-1940* (Ithaca, NY: Cornell University Press, 1990); Jennifer Price, *Flight Maps: Adventures with Nature in Modern America* (New York: Basic Books, 1999); Douglas Cazaux Sackman, “‘By Their Fruits Ye Shall Know Them’: ‘Nature Cross Culture Hybridization’ and the California Citrus Industry, 1893-1939,” *Citriculture and Southern California, California History* 74, no. 1 (Spring, 1995): 82-99; Susan R. Schrepfer and Philip Scranton, eds., *Industrializing Organisms: Introducing Evolutionary History* (New York: Routledge, 2004); Kendra Smith-Howard, *Pure and Modern Milk: An Environmental History Since 1900* (New York: Oxford University Press, 2014); and Richard White, *The Organic Machine: The Remaking of the Columbia River* (New York: Hill and Wang, 1995).



reviewing the conception of hybridity developed in the environmental history scholarship, historian Richard White contended that “wild nature constantly intersects with and interrupts” human activities.<sup>22</sup> The creation of “natural” color by food producers and retailers demonstrates the intricate and intimate relationships between “nature” and “culture” as well as the historical and cultural construction of ideas about “naturalness.” When consumers believed that the color, even when produced by human manipulation, was the “natural” and “right” color of a food, the distinction between nature and artifice was even more difficult to make.

Cultural theorist Raymond Williams has argued that the idea of nature “contains, though often unnoticed, an extraordinary amount of human history.”<sup>23</sup> Drawing on Williams, environmental historian William Cronon has described nature as “a human idea, with a long and complicated cultural history.”<sup>24</sup> In denying the nature-technology dichotomy, Edmund Russell asserts that industrialization has been a

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<sup>22</sup> Richard white, “From Wilderness to Hybrid Landscapes: The Cultural Turn in Environmental History,” *The Historian* 66 (3) (September 2004): 563.

<sup>23</sup> Raymond Williams, “Ideas of Nature,” in *Problems in Materialism and Culture* (London: Verso, 1980), 103-22. See also Williams, “Nature,” in *Keywords: A Vocabulary of Culture and Society*, rev. ed. (New York: Oxford University Press, 1983), 219-24. Leo Marx also has illuminated the yearning for nature, as opposed to the city and industrialization, as American idealism and cultural construction. What Marx describes as “the machine in the garden” points to the contradictory ideology of a pastoral life and the intrusion of technology into nature in American society. Leo Marx, *The Machine in the Garden: Technology and the Pastoral Ideal in America* (New York: Oxford University Press, 1964).

<sup>24</sup> William Cronon, “Introduction: In Search of Nature,” in *Uncommon Ground: Toward Reinventing Nature*, ed. William Cronon (New York: W. W. Norton, 1995), 20. On the historical construction of freshness, see Freidberg, *Fresh*.

biological as well as a mechanical process.<sup>25</sup> Building on their studies, the dissertation analyzes not only how scientists, administrators, and consumers conceptualized and acted on nature but also how they understood and created the artificiality and naturalness of foods.

My focus on color and visibility does not suggest that vision was *the* only important sense for the food industry or for consumers. While I contend that the expansion of food coloring businesses and the development of self-service merchandising accentuated the significance of sight, other senses have also been crucial for many consumers in selecting foods – particularly touch and smell.<sup>26</sup> Food manufacturers have conducted extensive research on the creation of artificial flavor.<sup>27</sup> A growing body of interdisciplinary work has also shown the multifaceted and historically situated nature of sensory knowledge, asserting that sensory perceptions are not simply personal, physiological sensation, but also shared cultural experiences.<sup>28</sup>

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<sup>25</sup> Edmund Russell, “The Garden in the Machine: Toward an Evolutionary History of Technology” in Schrepfer and Scranton, *Industrializing Organisms*, 2, 4.

<sup>26</sup> In the early- and mid-twentieth centuries, contemporary studies reported that touch and smell, as well as vision, were important for consumers’ food purchasing decisions. See Ernest Dichter, “An Exploratory Psychological Study of Consumer Reactions to Cellophane and Wax Paper Wrapped Bread,” December 1947, box 2, Ernest Dichter Papers (Accession 2407), Hagley Museum and Library, Wilmington, DE; and Carl W. Dipman, ed., *The Modern Grocery Store* (New York: Progressive Grocer, 1931):

<sup>27</sup> Constance Classen, David Howes, and Anthony Synnott, “Artificial Flavours,” in *The Taste Culture Reader: Experiencing Food and Drink*, ed. Carolyn Korsmeyer (New York: Bloomsbury Academic, 2005), 337-42.

<sup>28</sup> For a history of sensory experience, see for instance David Howes, ed., *Empire of the Senses: The Sensual Culture Reader* (New York: Berg, 2005); David Howes and Constance Classen, *Ways of Sensing: Understanding the Senses in Society* (New York:

This dissertation adds a new perspective to the sensory studies by examining how legislators, food producers, and retailers constructed a discourse about the centrality of vision. Visuality was not ahistorical or static. As my research shows, what people understood from the color of foods changed over time. Nor does this dissertation analyze how consumers *actually* saw foods or sensed their colors. It focuses on how producers, advertisers, and retailers sought to create and control the color of foods and store environments that would appeal to consumers' eyes and influence their food purchasing decisions.

The dissertation hence is not about the "hegemony of vision." In *Modernity and the Hegemony of Vision*, David Michael Levin has demonstrated that "the domination, the hegemony, of a visual paradigm" is a historical construction.<sup>29</sup> Philosophers and cultural theorists have argued for the hegemony of vision in modernity in many different ways and for various reasons. Levin, as well as contributors to the volume, provides nuanced views on the ocularcentrism of

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Routledge, 2014); and Mark M. Smith, *Sensing the Past: Seeing, Hearing, Smelling, Touching and Tasting in History* (Berkeley: University of California Press, 2008). For discussion about contemporary corporate marketing in relation to the senses, see Bertil Hultén, Niklas Broweus, and Marcus van Dijk, *Sensory Marketing* (New York: Palgrave, 2009); Aradhna Krishna, ed., *Sensory Marketing: Research on the Sensuality of Products* (New York: Routledge, 2010); and B. Joseph Pine II and James H. Gilmore, "Welcome to the Experience Economy," *Harvard Business Review* (July-August 1998): 97-105.

<sup>29</sup> David Michael Levin, *Modernity and the Hegemony of Vision* (Berkeley: University of California Press, 1993), 2. For a history of vision and modernity, see also John Berger, *Ways of Seeing* (1972; repr., New York: Penguin Books, 1990); Hal Foster, ed., *Vision and Visuality* (Seattle: Bay Press, 1988); Martin Jay, *Downcast Eyes: The Denigration of Vision in Twentieth-Century French Thought* (Berkeley: University of California Press, 1994); and Martin Jay and Sumathi Ramas, eds., *Empires of Vision: A Reader* (Durham: Duke University Press, 2014).

modernity by exploring and revisiting whether, or how, modern Western thought and culture were dominated by visuality.

My examination of visuality in food consumption delineates the hegemonization, or hierarchization, of vision by various agents in government and industry. As discussed in *Modernity and the Hegemony of Vision*, questions about a vision-centered paradigm entailed historical connections between vision and knowledge, vision and power, and vision and ethics. For instance, Michel Foucault contended that the power to see and the power to make visible were inherently connected to the power to control. For Foucault, the hegemon of vision in modernity was historically distinctive and functioned in a very different way than earlier times, for it was “allied with all the forces of our advance technologies.”<sup>30</sup>

Scholars of visual culture and historians of the senses have explored how ways of seeing and the meaning of visuality have changed over time. Jonathan Crary has investigated how optical devices, such as the camera obscura and the stereoscope, changed the way people perceived their environment in nineteenth-century Western society.<sup>31</sup> In *Vision and Visuality*, the contributors suggest that the history of visual experiences cannot be simply reduced to the notion of ocularcentrism. The meaning of vision and visuality did not remain the same across time and space.<sup>32</sup> While building on these visual culture studies, the dissertation reveals not only the historical

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<sup>30</sup> Levin, *Modernity and the Hegemony of Vision*, 6-7.

<sup>31</sup> Jonathan Crary, *Techniques of the Observer: On Vision and Modernity in the Nineteenth Century* (Cambridge, MA: MIT Press, 1992).

<sup>32</sup> Foster, *Vision and Visuality*.

formation and transformation of visibility but also the inter-sensorial relationships between vision and taste.

Historian Emily Ann Thompson's study on the history of sound in the early-twentieth-century United States, *The Soundscape of Modernity*, provides a critical framework for analyzing the transformation of sensory experiences.<sup>33</sup> Her examination of changes in what people heard and how they listened shows that sound, which might be considered as "natural" or "ahistorical," has passed through an intricate process. Similarly, this dissertation asserts that how food looked, how consumers considered the color of foods, and what it signified changed due to political regulations, marketing strategies, technological development, and consumers' changing notions of naturalness and artificiality.

By analyzing the regulation, production, and marketing of food color as they relate to the fields of business history, environmental history, and visual culture studies, this dissertation offers a new approach to examining the development of the food business and the transformation of American foodways. Anthropologists and scholars in food studies and sensory history have shown the political and economic roles that food plays in a global context, the cultural significance of food, and the historical construction of taste (both as sensory perception and as a disposition).<sup>34</sup>

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<sup>33</sup> Emily Ann Thompson, *The Soundscape of Modernity: Architectural Acoustics and the Culture of Listening in America, 1900-1933* (Cambridge, MA: MIT Press, 2002).

<sup>34</sup> See Warren Belasco, *Appetite for Change: How the Counterculture Took on the Food Industry*, 2nd ed. (Ithaca, NY: Cornell University Press, 2007); Belasco, *Meals to Come: A History of the Future of Food* (Berkeley: University of California Press, 2006); Warren Belasco and Roger Horowitz, eds., *Food Chains: From Farmyard to Shopping Cart* (Philadelphia: University of Pennsylvania Press, 2009); Sidney Mintz, *Sweetness and Power: The Place of Sugar in Modern History* (New York: Penguin Books, 1985); Alexander Nuetzenadel and Frank Trentmann, eds., *Food and*

Few, however, have investigated the look of food or the relations between vision and taste from a cultural and historical perspective.<sup>35</sup>

In exploring the color of foods as a sign that signified naturalness, freshness, and creativity in the twentieth-century United States, this dissertation broadens the semiotic understanding of culture and society. Literary theorist Roland Barthes understood food as “a system of communication, a body of images, a protocol of usages, situations, and behavior.”<sup>36</sup> His understanding of food elucidates the

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*Globalization: Consumption, Markets and Politics in the Modern World* (New York: Berg, 2008); Jeffrey M. Pilcher, *Que Vivan los Tamales!: Food and the Making of Mexican Identity* (Albuquerque: University of New Mexico Press, 1998); John Soluri, *Banana Cultures: Agriculture, Consumption, and Environmental Change in Honduras and the United States* (Austin: University of Texas Press, 2005); James I. Watson and Melissa I. Caldwell, eds., *The Cultural Politics of Food and Eating: A Reader* (Malden, MA: Blackwell Publishing, 2005); Richard Wilk, *Home Cooking in the Global Village: Caribbean Food from Buccaneers to Ecotourists* (New York: Berg, 2006); and Richard Wilk, ed., *Fast Food/Slow Food: The Cultural Economy of the Global Food System* (New York: Altmanira Press, 2006).

<sup>35</sup> Cultural and art historians have explored the relationships between vision and taste by focusing on food images in paintings, most notably Flemish painting. They provide insightful and informative analysis of the visualization of taste, but few examine the appearance of actual foods. See Judith A. Barter, et al., *Art and Appetite: American Painting, Culture, and Cuisine* (Chicago: Art Institute of Chicago, 2013); Kenneth Bendiner, *Food in Painting: From the Renaissance to the Present* (London: Reaktion Books, 2004); Norman Bryson, *Looking at the Overlooked: Four Essays on Still Life Painting* (Cambridge, MA: Harvard University Press, 1990); Silvia Malaguzzi, *Food and Feasting in Art*, trans. Brian Phillips (Los Angeles: J. Paul Getty Museum, 2008); Gillian Riley, *A Feast for the Eyes: Evocative Recipes and Surprising Tales Inspired by Paintings in the National Gallery* (London: National Gallery London, 1998); and Simon Schama, “Perishable Commodities: Dutch Still-Life Painting and the ‘Empire of Things,’” in *Consumption and the World of Goods*, ed. John Brewer and Roy Porter (New York: Routledge, 1993), 478-88.

<sup>36</sup> Roland Barthes, “Toward a Psychosociology of Contemporary Food Consumption,” in *Food and Drink in History, Selections from the Annales Economiques, Sociétés, Civilizations* Vol. 5, eds. Robert Forster and Orset Ranum, trans. Elborg Forster and

importance of food as a symbol that signifies cultural values as well as social systems and structures. My primary objective, however, is not simply to describe the relations between the signifier (color) and the signified (food quality and consumer taste). The dissertation analyzes how food manufacturers, government officials, scientists, and consumers constructed, naturalized, and challenged social and cultural meanings of the color of foods.

My study also adds to the understanding developed in the studies of industrialized food products. Aaron Bobrow-Strain's and E. Melanie DuPuis's studies on white bread and milk respectively trace the industrialization of food production and the construction of cultural knowledge about food.<sup>37</sup> Bobrow-Strain's is one of the few books that focus on the color of food from historical and cultural perspectives. By tracing the development of soft, white bread and consumers' changing conceptions about the product in the twentieth-century United States, he asserts that its appeal lay in the way it resonated with a growing cultural embrace of science and industrial expertise as icons of progress and civilization.<sup>38</sup> DuPuis provides insights into how

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Patricia M. Ranum (Baltimore: Johns Hopkins University Press, 1979), 166-73, originally published in *the Annales Économies, Sociétés, Civilizations* no. 5 (September-October 1961), 977-86. Mary Douglas similarly insisted that food was a conveyor of the messages about "different degrees of hierarchy, inclusion and exclusion, boundaries and transactions across the boundaries." Mary Douglas, "Deciphering a Meal," in *Food and Culture: A Reader*, eds. Carole M. Counihan and Penny Van Esterik (New York: Routledge, 1997), 36-54.

<sup>37</sup> Aaron Bobrow-Strain, *White Bread: A Social History of the Store-Bought Loaf* (Boston: Beacon Press, 2012); and E. Melanie DuPuis, *Nature's Perfect Food: How Milk Became America's Drink* (New York: New York University Press, 2002).

<sup>38</sup> Bobrow-Strain, *White Bread*, 31.

milk became “the perfect food” in the United States at the turn of the twentieth century. She maintains that milk’s exalted status as an essential food largely resulted from changes in social habits, politics, transportation networks, and technology rather than milk’s intrinsic character. Expanding their inquiries into the historical construction of popular perceptions about certain foods in the era of mass production and mass consumption, this dissertation explores how the industrialization of food production, the rise of corporate capitalism and the mass market, and innovations in food science and dye production helped construct and standardize what American consumers came to expect in the color of foods.

My interest in, and passion for, food partly comes from one of the greatest American food writers, M. F. K. Fisher (1908-1992). She enthusiastically thought about and wrote about food throughout her lifetime. In one of her essays, she explained her motivation to write about food:

People ask me: Why do you write about food, and eating and drinking? Why don’t you write about the struggle for power and security, and about love, the way others do? They ask it accusingly, as if I were somehow gross, unfaithful to the honor of my craft. The easiest answer is to say that, like most other humans, I am hungry. But there is more than that. It seems to me that our three basic needs, for food and security and love, are so mixed and mingled and entwined that we cannot straightly think of one without the others. So it happens that when I write of hunger, I am really writing about love and the hunger for it, and warmth and the love of it and the hunger for it ... and then the warmth and richness and fine reality of hunger satisfied ... and it is all one.<sup>39</sup>

Food is not simply an edible object consumed for nutritional purposes. Historical studies of food culture help us understand not only various meanings of foods across

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<sup>39</sup> M. F. K. Fisher, *The Gastronomical Me* (New York: North Point Press, 1943), ix.



time and space but also the connection between regional, national, and global politics and economy. A history of color can enrich the scholarship by showing how taste and sight are interconnected. Fisher's powerful message has always been a source of inspiration and assures me of the importance of studying food.

### **Chapter Outline**

The dissertation integrates food production, marketing, retailing, regulation, and consumption into one historical narrative by analyzing various functions of color in the food business. I examine the color of agricultural produce as an indicator of naturalness, freshness, and ripeness, and demonstrate that dynamic relations among culture, ecology, and economy created the color of foods, which many consumers considered "natural." I also investigate how firms created and presented, as well as how they constructed the mass market for, processed foods that consumers had never before seen or eaten. As mass-produced foods flooded into the American kitchen in the mid-twentieth century, food companies promoted colorful dishes, such as Jell-O and decorated cakes, as a way for women to express their aesthetic tastes. In highlighting ideologies about gender and industrialization embedded in narratives about food coloring in the household, I explore how ideas about femininity and artificiality became closely intertwined in mass consumer culture.

The first chapter, "Creating 'Safe' Colors," examines the contested processes of creating "safe" dyes, by focusing on the regulation, manufacturing, and marketing of food dyes from the 1870s to the 1930s. The development of the American food dye industry was closely tied in with government policies on food safety and public health. The definitions of "safe" and "harmless" dyes rested on food and dye manufacturers'

corporate interests and government officials' visions of a national food law. Federal and state governments began regulating synthetic dyes, as well as other food additives, at the turn of the twentieth century when the American public voiced heightened concerns over food adulteration. Yet legislators and government scientists not only oversaw and regulated food coloring practices but also endorsed synthetic dyes as a legitimate ingredient for foods, especially industrially processed foods, such as canned foods, snacks, and candies. Government policies on food safety stimulated the integration of color manipulation into food businesses, encouraging the artificial coloration of foods.

The next chapter, "The Color of New Tastes," discusses how legislators, food producers, and marketers constructed and propagated ideas about how food should look, during the late nineteenth and early twentieth centuries when American consumers began encountering new food products, including agricultural produce from distant production sites and newly invented processed foods. Corporate interests in selling a particular variety of foods, and market competition intensified by the expansion of the national market, served to standardize the colors of food products, helping to teach consumers what to expect on the market. Regulation and court decisions not only defined how food should look but also legitimized and endorsed ideas about the "natural" color of certain products. Yet consumers' ideas about food color were not simply the product of a corporate conspiracy to deceive consumers. While firms helped construct public perception about the "natural" color of foods, consumers' strong notions about how food should look in turn affected corporate activities and government regulation. Food advertisers helped visualize and represent those consumer expectations about food color, using colorful images. In the 1920s and

1930s, as color printing became widely available, mass-circulated print media served to reinforce and standardize popular ideas about the color of foods, teaching consumers how food should look.

To meet consumer expectations, food producers manipulated the color of foods. The third chapter, “Creating ‘Natural’ Colors,” explores how firms understood consumer expectations about the “natural” color of foods and how they translated that understanding to the appearance of their products. By controlling the color of foods, producers constructed the “natural” color of foods as a hybrid between nature and technology. As more foods became available and the food market expanded nationally, the food industry and government scientists increasingly considered the manipulation and standardization of food color as an essential means to improve the marketability of products and to regulate food production, distribution, and marketing.

The fourth chapter, “Creating ‘Fresh’ Colors in Food Stores,” moves into supermarkets. By tracing the development of self-service merchandising for perishable items, specifically fruits, vegetables, and meat, from the 1920s to the 1950s, the chapter examines how food retailers controlled and created the “fresh” color of produce and meat and how they presented “freshness” to their customers. Ideas about freshness became connected to visual order, sanitation, and brightness more than to how much time had passed after produce was harvested or meat was cut. In supermarkets where many foods were already packaged, consumers could not smell or touch the product directly and needed to rely mostly on visual information, especially color, in selecting food. Self-service supermarkets provided better visibility than counter-service retailing in late-nineteenth-century local grocery stores, but the visibility supermarkets created was carefully controlled by manufacturers and traders.

Mounds of bright fruits and vegetables and a pile of bright red meat in transparent film, displayed in refrigerated cases and kept under constant control by retailers, presented to consumers a look of freshness and constructed a new kind of the visual environment in modern food stores.

The fifth chapter, “the Palette of Domesticity,” turns to the shifting role of “Mrs. Consumers” as “producers” by focusing on women’s food coloring practice in households from the late nineteenth to the mid-twentieth century. The chapter demonstrates that the commercialization of food colors, the development of food technology, changes in family structures and gender roles, and the transformation of eating habits altered the extent to which housewives accepted artificiality in cooking foods. The incorporation of artificiality into household cooking depended on women’s social and economic status. In the late-nineteenth and early-twentieth centuries, artificiality was a luxury of upper-class women as the creation of elaborately decorated colorful foods required time, kitchen space, equipment, and expensive ingredients, including food dyes, most of which working-class households could not afford. As less expensive artificial ingredients, including food dyes, packaged gelatins, and cake mix, became widely available among middle-class households in the early- to mid-twentieth century, making colorful foods became not only affordable for wider classes of women but also less-time consuming and more convenient. In advertising rhetoric, food manufacturers, cookbooks, and women’s magazines reframed the artificiality of cake mixes and food coloring as the hallmarks of convenience and creative cooking by stressing that convenient packaged goods, made with artificial ingredients, did not indicate housewives’ laziness but would aid them to be more creative and devote their time for their family.

## Sources

This dissertation is based primarily on archival research. To examine the business-to-business marketing and contemporary issues that concerned the food and dye industries, I use trade journals from various industries, including chemical, food processing, meat packing, dairy, grocery, citrus, and advertising. Trade journals do not necessarily show what companies were actually doing. Yet they do illustrate the political and economic conditions that affected particular industries, the development of new technologies, the ways producers and retailers reacted to government regulation, and general trends of the market.

I draw on published and unpublished records of federal agencies to analyze the role of the federal government, specifically the USDA, and its relations with the food and dye industries. The records of the USDA and the FDA at the National Archives (College Park, MD) provide insights into food color research, administrative policies about food adulteration and color additives, and individual scientists' and officials' views on food coloring. I also use court cases not only to explore government policies on food coloring but also to explore how government officials, food producers, and dye makers helped construct ideas about food and color.

Cookbooks and recipe leaflets distributed by food companies are crucial sources to analyze how the teaching of cooking in general and of coloring foods in particular served as a part of corporate marketing strategies and how consumers gained knowledge about food color. By analyzing advertisements, newspapers, and women's magazines, including the *Ladies' Home Journal*, *Good Housekeeping*, and *Boston Cooking School Magazine*, I explore how food companies, home economists, and cookbook writers created a discourse about food coloring, femininity, and artificiality.

By weaving these materials together, the dissertation illustrates how the research and control of color became embedded into food production, marketing, and consumption. The initiative to manipulate the color of foods involved large sectors of the U.S. and global economy, ranging from agricultural farmers, food processors, and appliance companies, to giant chemical conglomerates. The dissertation brings together these various businesses and actors as well as diverse themes, including the relationships between nature and artifice, the rise of corporate capitalism, the transformation of visuality, and the connection (and the disconnect) between taste and sight.

Color became an obsession for the food industry in the late nineteenth century. Consumers have been stubbornly obsessed with colors, too. I illuminate how color helped form and transform people's relationships with food, nature, and society, and hope to offer insights into how color provides a new way of seeing the past, present, and future.

## Chapter 1

### CREATING “SAFE” COLORS

In 1930, home economists Ruetta Blinks and Willetta Moore declared that consumers could be confident that “the use of unwholesome chemicals has been practically eliminated” in commercial food dyes. “There is no longer any reason for the consumer to look upon attractively colored foods with suspicion,” they told the readers of *Food Purchasing for the Home*.<sup>1</sup> Manufacturers of candy, ice-cream, butter, sausages, and many other products now largely employed synthetic dyes certified as safe by government inspectors. However, the “harmlessness” and “safety” of those synthetic colors were still questionable. While the federal government had enacted the Pure Food and Drug Act in 1906 – the first national legislation against food adulteration – the act did not eliminate toxic dyes from the market as it regulated primarily the labeling of foods rather than the product itself.

The definition of “safe” and “harmless” dyes rested on food and dye industries’ corporate interests and government officials’ political decisions. Government scientists conducted extensive research on synthetic dyes. Yet their interpretation of scientific examinations and understanding of “harmless” colors often reflected federal officials’ vision of a national food law and industry’s commercial needs for profitable synthetic dyes. In fact, some food dyes which had initially been

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<sup>1</sup> Ruetta Day Blinks and Willetta Moore, *Food Purchasing for the Home* (Chicago: J. B. Lippincott, 1930), 66.

deemed “not harmless” were later certified by the government as “safe” for food use partly due to a demand from dye makers.

By analyzing the ambiguous and contested meanings of “safe” colors and the inter-industrial relationships between the food and dye industries from the 1870s to the 1930s, this chapter examines the social and cultural implications of technological development and of political and economic change. The early manufacturing of synthetic food dyes was part of the expansion of the chemical industry at the turn of the twentieth century. Chemical firms, particularly National Aniline & Chemical Company, H. Kohnstamm & Company, and Heller & Merz Company, manufactured food dyes and supplied them to food and beverage companies. As the use of synthetic additives for foods increased, chemical companies exerted a powerful impact on the passage and implementation of food regulations. The 1906 act marked not only the first federal legislation against food adulteration but also the creation of a new market for “safe” dyes and the expansion of food coloring businesses.

The regulation and chemical analysis of food color embodied a new understanding of foods that became common in Europe and in the United States at the turn of the twentieth century. After research in nutrient science took off in mid-nineteenth-century Europe, scientists began to analyze every single constituent part of food. As foods were increasingly understood based on their nutrient content, what historian Uwe Spiekermann calls a “nutrient paradigm” fundamentally transformed the perception of food in science, business, and politics.<sup>2</sup> Based on research in food

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<sup>2</sup> Uwe Spiekermann, “Redefining Food: The Standardization of Products and Production in Europe and the United States, 1880-1914,” *History and Technology* 27, no. 1 (March 2011): 11-36.



science and technology, food manufacturers created new products by isolating and recombining various nutrients and raw materials. Government officials believed that control of nutritive contents and other ingredients, including color additives, was the most effective way of regulating fraud and deception in food production and sale.<sup>3</sup> Deconstructing the physical properties of food was necessary for investigating and regulating food color. As synthetic dyes became the subject of government regulation and scientific research, regulators, scientists, and manufacturers understood color as a constituent part of food, which could be analyzed, transformed, and isolated from the product.

In food regulatory policies, the addition of colors, as well as other chemical substances, became an indicator of both “safety” and “purity,” on the one hand, and “adulteration,” on the other. The 1906 Pure Food and Drug Act prohibited producers from *adding* dyes or any other impure substances to foods to conceal their damage or inferiority. The American food safety policy hence did not effectively function to prevent or regulate the physiological contamination of food products even if bacteria-infected food was not safe to consume.<sup>4</sup> Moreover, the government did not necessarily forbid the addition of deleterious substances to foods as long as they were labeled as such. Since the 1906 act regulated labels (misbranding) rather than products, food was deemed “adulterated” if it was colored with dyes (either harmless or poisonous) to make it look better than it appeared without any labeling.

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<sup>3</sup> Ibid., 13-14.

<sup>4</sup> See Courtney I. P. Thomas, *In Food We Trust: The Politics of Purity in American Food Regulation* (Lincoln, NB: University of Nebraska Press, 2015).

While legislators and government scientists oversaw and regulated food coloring practices, they also endorsed certain synthetic dyes as harmless and legitimate ingredients for foods. Dye manufacturers in turn made “strategic use of public policy” by stressing the importance of complying with a food law and by actively participating in the implementation of food dye regulation.<sup>5</sup> In advertising rhetoric, food dye makers often emphasized that their dye products had passed federal investigation in order to demonstrate the safety of their dyes, seeking to attain competitive advantage over other manufacturers.

The regulation and technological development of food coloring altered how people saw foods and what they understood from the color of foods, as well as how producers colored them. With the expansion of the food coloring business at the turn of the twentieth century, a variety of foods, including products that many Americans had never seen or eaten, with bright, uniform colors, increasingly appeared on their tables. By the 1900s, the American dining table was full of artificially colored foods, including ketchup, canned foods, sausage, butter, cheese, jellies, and ice cream. In

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<sup>5</sup> Donna J. Wood, *Strategic Uses of Public Policy: Business and Government in the Progressive Era* (Boston: Pitman, 1986); and Wood, “The Strategic Use of Public Policy: Business Support for the 1906 Food and Drug Act,” *Business History Review* 59, no. 3 (Autumn 1985): 403-32. Wood was not the first scholar to use the phrase or to develop the theory of strategic use of regulation. Yet her study was one of the earliest to explore the theory from a historical perspective and applied it to the passage and enforcement of the 1906 Pure Food Law. In addition to Wood’s examination on industry’s strategic use of public policies, scholars have shown that not only firms but also government officials also held strategic interest in enacting a pure food law. See also Daniel P. Carpenter, *The Forging of Bureaucratic Autonomy: Reputations, Networks, and Policy Innovation in Executive Agencies, 1862-1928* (Princeton: Princeton University Press, 2001); and Clayton A. Coppin and Jack High, *The Politics of Purity: Harvey Washington Wiley and the Origins of Federal Food Policy* (Ann Arbor: University of Michigan Press, 1999).

food stores, an array of colorful foods, placed in open-display cases, created store interiors that appealed to shoppers' visual sense and offered consumers more access to goods. With glances at beautifully arranged foods in window displays and shelves filled with colorful foods, the yellow color of pasta, pink and red colored sausage, candies with red, green, and blue shades – glaring, bright mixtures of hues beamed into consumers' eyes.

### **From Natural to Synthetic Dyes**

Before synthetic dyes became common at the turn of the twentieth century, food producers had relied largely on so-called natural dyes, derived from plants and organic minerals, including spinach juice, carrot juice, marigold, and saffron. A change of dye ingredients used for coloring butter, from natural to synthetic dyes, exemplifies the development and transformation of the American food dye business and the commercialization of food colors from the late nineteenth to the early twentieth century. At least since the early nineteenth century, dairy producers in the United States, as well as in Europe, had colored their butter with plant-extracted coloring matter to maintain uniform yellow appearance.<sup>6</sup> Among the most often used butter colorings was extracts from plant seeds called annatto (Fig.1). While annatto

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<sup>6</sup> F. S. Burch, *ABC Butter Making, Hand-Book for the Beginner* (Chicago: C. S. Burch, 1888), 30; Sewall Guthrie, *The Book of Butter: A Text on the Nature, Manufacture and Marketing of the Product* (New York: MacMillan, 1918), 149; G. I. McKay and C. Larsen, *Principles and Practice of Butter-Making* (New York: John Whey & Sons, 1906), 239; and Charles A. Publow, *Questions and Answers on Buttermaking* (New York: Orange Judd, 1911), 32; and Report of the Industrial Commission on Agriculture and on Taxation in Various States (Second Volume on Agriculture), H.R. Rep. 180, 57th Con. (1901): 50, 91.

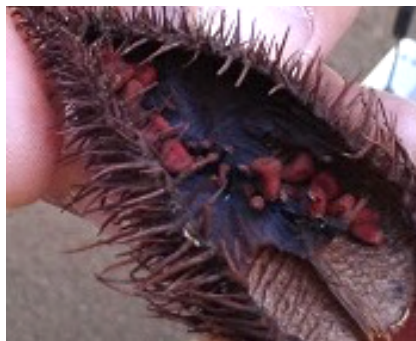


Figure 1 Annatto seeds. Photograph by author.

gave more desirable colors to butter than other ingredients, such as carrot juice, the preparation of annatto coloring was a time-consuming process, which usually took three to four days.<sup>7</sup>

Annatto was extracted from the seeds of a tree called *Bixa orellana*, indigenous to Central and South America.<sup>8</sup> In these regions, annatto had traditionally been used as body paint and a hair dye to ward off evil spirits, including illness, and to produce success in hunting. Indigenous communities also used the dye for life-cycle ceremonies and war paint, as well as for coloring foods.<sup>9</sup> After the Spanish conquest

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<sup>7</sup> Annatto was immersed into water, while potash and sal-soda (sodium carbonate) were mixed into water in a different container, and each container was set aside for one day. Then the two solutions were mixed together until they were completely dissolved for two or three days. X. A. Willard, *A Treatise on American Butter Factories and Butter Manufacture* (Madison, WI: Atwood & Culver, 1871), 42-43.

<sup>8</sup> Annatto was also called Arnatto or Annotto in Jamaica; in the French islands it was known as Roucou, Urucu, and Rocour; on the Spanish Main indigenous people called it Achiotl. "Annatto," Royal Gardens, Kew, *Bulletin of Miscellaneous Information*, no. 7 (July 1887): 1.

<sup>9</sup> "Annatto," Royal Gardens, Kew, *Bulletin of Miscellaneous Information*, no. 9 (September 1887): 4; and R. A. Donkin, "Bixa Orellana: 'The Eternal Shrub,'" *Anthropos*, Bd. 69, H. 1/2 (1974): 41. See also H. D. Preston and M. D. Rickard,

of Mexico in the early sixteenth century, annatto was introduced to Europe. Britain, Spain, and France imported the dye from their colonies, including Ecuador, Guinea, Jamaica, and Guadeloupe, to color not only foods but also silk and other textiles. In these European colonies, annatto became one of the staple products shipped to Europe as well as North America.<sup>10</sup> Jamaica was one of the earliest colonies that started commercial production of annatto extracts, and the majority of its product was exported to the United States.<sup>11</sup>

In the 1870s, the consumption of annatto dyes rapidly increased as the coloring of butter, as well as other food products, became commercialized in Europe and in the United States. Dye manufacturers, including the Christopher Hansen's Laboratory Company and Wells, Richardson & Company, introduced annatto-based food dyes, called "butter colors," often in ready-to-use packs, prepared specifically for coloring butter (Fig.2).<sup>12</sup> Until then, dairy farmers had made their own dyes by extracting colors from carrots and annatto. Commercially produced butter colors enabled dairy

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"Extraction and Chemistry of Annatto," *Food Chemistry* 5 (1980): 47-56; and George Whitley, "On Cheese-Colouring," *Farmers Magazine*, June 1842.

<sup>10</sup> "Annato," *Bulletin of the Botanical Department Jamaica* 2, no. 7 (June 1888): 4; and Leone Levi, ed., *Annals of British Legislation* Vol. 4 (London: Smith, Elder, 1859).

<sup>11</sup> Peru and Brazil also supplied annatto to the American market. "Cultivation and Utilization of Annatto," *Bulletin of the Imperial Institute* 6 (1908): 171; and Frank Evans, ed., *Quarterly Bulletin of Miscellaneous Information* (Port-of-Spain, Trinidad: Botanical Department, Government Printing Office, 1908), 5.

<sup>12</sup> The Christopher Hansen's Laboratory Company was founded by Danish pharmacist Christopher Hansen in the early 1870s in Copenhagen, Denmark. The firm had been well known for its cheese rennet (a substance extracted from cow's stomach), used for cheese manufacturing. Christopher Hansen Laboratory developed annatto butter colors in 1876. Two years later, the firm expanded its branch to the United States and opened



Figure 2 Christopher Hansen's Laboratory Company butter color advertisement. *Dairy and Produce Review*, December 1902.

producers to color their butter by simply adding coloring solutions from a container they purchased at a nearby supply house. The butter color was diluted in a small amount of cold water and added to the cream before churning. The amount of color added to butter depended on the market requirements, the season of the year, strength

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a factory in Little Falls, New York. The company exhibited its butter color at the Centennial International Exhibition of 1876 in Philadelphia. "History," Christopher Hansen Laboratory Company, accessed 21 September 2015, <http://www.chr-hansen.com/about-us/history>. Wells, Richardson, founded by three American businessmen in Burlington, Vermont, in 1872, manufactured medicines, infant formula, fabric dyes, and other household products, as well as butter colors. Burlington Board of Trade, *Burlington, Vt. as a Manufacturing, Business and Commercial Center, with Brief Sketches of its History, Attractions, Leading Industries, and Institutions* (Burlington, VT: Burlington Board of Trade, 1890); and Charles H. Possons, *Burlington in Brief* (Glens Falls, NY: Burlington Grocery Company, 1890).

of the color, and the color and richness of the milk fat.<sup>13</sup> Butter color makers promoted annatto dyes as harmless, extracted from natural sources, to distinguish their brands from poisonous coloring. Wells, Richardson's butter color was "the golden yellow coloring matter of the Annatto Plant, free from any possible form of adulteration, and purified from the reddish color naturally associated with it," the company asserted in an 1875 advertisement.<sup>14</sup>

It was crucial for dye makers and suppliers to establish a brand image and reputation for reliability as "legitimate" producers to broaden their market. Until the early twentieth century, there had been no federal or state regulation concerning food coloring practices. Without effective regulatory systems, there were more than eighty additives used for coloring foods on the American market, and some of them were toxic.<sup>15</sup> Some producers used poisonous metals and chemicals for coloring foods. Chalk was used to whiten bread; lead and copper were added to canned foods to preserve color; and lead chromate was used to give milk a yellowish creamy shade.<sup>16</sup>

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<sup>13</sup> Otto F. Hunziker, *The Butter Industry: Prepared for the Use of Creameries, Dairy Students and Pure Food Departments* (LaGrange, IL: the author, 1920); and Publow, *Questions and Answers*, 32. See also F. C. Blanck to William H. Murray, 14 March 1922, box 340, entry 1001, Records of the Food and Drug Administration, Record Group (RG) 88, National Archives, College Park, MD (NACP).

<sup>14</sup> Wells, Richardson Advertisement, *Eleventh Annual Report of the American Dairymen's Association for the Year of 1875* (Rochester, NY: Democrat and Chronicle Book and Job Printing House, 1876).

<sup>15</sup> Bernhard C. Hesse, "Coal Tar Colors Used in Food Products," U.S. Department of Agriculture (USDA), Bureau of Chemistry, Bulletin no. 147 (1912): 11, 20-21.

<sup>16</sup> Adam Burrows, "Palette of Our Palates: A Brief History of Food Coloring and Its Regulation," *Comprehensive Reviews in Food Science and Food Safety* 8 (2009): 396; "Food Adulteration Fast Becoming a Lost Art," *Food Industries* 1, no. 6 (March 1929): 269; and David Denison Stewart, "A Clinical Analysis of Sixty-Four Cases of

As synthetic dyes became increasingly available for food use during the last few decades of the nineteenth century, many butter color producers turned to these new chemically manufactured colors. In the late 1870s, Wells, Richardson and Christopher Hansen's Laboratory introduced their first synthetic butter colors. The Heller & Merz Company of Newark, New Jersey also developed synthetic yellow dyes, called Yellow AB and Yellow OB, for coloring butter and other food products.<sup>17</sup> These synthetic dyes were oil-soluble, so that they easily imparted color into fat, such as butter and cheese. Synthetic butter colors were generally much stronger in their coloring properties than natural colors like annatto. As the amount required was much less than with annatto or any other natural colors due to their intensity, synthetic dyes were more economical. Moreover, synthetic dyes were less subject to the influence of light while the color of annatto dyes faded when exposed to direct sunlight.<sup>18</sup> The new synthetic butter color "will not turn rancid; gives the brightest color; is the cheapest color made," Wells, Richardson assured the readers of the farm journal *Western Rural*.<sup>19</sup> By 1900, synthetic butter colors had displaced annatto dyes almost entirely.<sup>20</sup>

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Poisoning by Lead Chromate, Used as a Cake-Dye," *Medical News* 51, no. 27 (December 31, 1887): 753-58. Lead chromate was a highly poisonous chemical compound with a vivid yellow color, usually used in paints. It was a carcinogen. If swallowed, the substance could cause abdominal pain, nausea, vomiting, and headache.

<sup>17</sup> Hesse, "Coal-Tar Colors," 48.

<sup>18</sup> E. H. Farrington and Martin Meyers, "A Comparison of Aniline and Anatto Butter Colors in Butter Making," University of Wisconsin, Agricultural Experiment Station Bulletin no. 152 (June 1907): 5; Hunziker, *Butter Industry*; and "Use of Coloring in Butter," *Prairie Farmer*, September 26, 1907.

<sup>19</sup> Wells, Richardson Advertisement, *Western Rural*, February 17, 1877. Wells, Richardson introduced another synthetic butter color, "Improved Butter Color," in the



The global and domestic development of the synthetic dye industry transformed the nature of food dye businesses in terms not only of scale but also of the industry's structure and conceptions about safe colors. In the late nineteenth and early twentieth centuries, the chemical industry, especially synthetic dye and pharmaceutical manufacturing, represented the high technology industry in the world as the industry required advanced scientific research to develop new products.<sup>21</sup> Germany was the global leader in this state-of-the-art industry and dominated the global synthetic dye production between 1870 and 1914. Dye production in Germany far exceeded the amount produced not only in the United States but also in Great Britain, where British chemist William Perkin had synthesized the first dye, mauve, in 1856.<sup>22</sup> By 1881, German firms manufactured nearly half of the world's synthetic dye production.<sup>23</sup> Unlike the United States, where antitrust legislation restricted cartel operations, the German government established policies on patents, cartels, and research to promote the development of the chemical industry. In addition, German firms' global market

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early 1880s. See also "A Reliable Butter Color," *Farm, Field, and Fireside*, December 31, 1898; and "Butter Color Needed Now," *Farm, Field, and Fireside*, March 25, 1899; "Never Varies in Strength," *Farm, Field, and Fireside*, May 6, 1899; and "Used in the Best Butter," *Farm, Field, and Fireside*, May 20, 1899.

<sup>20</sup> "Abolishing Coal Tar Colors," *Dairy and Produce Review* 4, no. 3 (January 22, 1903): 2; and "Butter Color Poison," *Farm, Field, and Fireside*, February 10, 1906.

<sup>21</sup> Kathryn Steen, *The American Synthetic Organic Chemical Industry: War and Politics, 1910-1930* (Chapel Hill: University of North Carolina Press, 2014), 19.

<sup>22</sup> For the history of synthetic dye development, see Regina Lee Blaszczyk, *The Color Revolution* (Cambridge, MA: MIT Press, 2012); and Simon Garfield, *Mauve: How One Man Invented a Color That Changed the World* (New York: W. W. Norton, 2000).

<sup>23</sup> Steen, *The American Synthetic*, 23.

and sales strategies as well as pioneering research laboratories boosted industrial innovation. With immense economic power and advanced technology, the German chemical industry helped to build globalization of the late nineteenth century by promoting the exchanges of dyestuffs, human resources, and financial capital.<sup>24</sup>

Technological transfer on a global scale was essential for the development of the American dye industry in the mid- to late-nineteenth century.<sup>25</sup> Founders of many American dye companies were German immigrants. H. Kohnstamm & Company was among the first to recognize the potential profit of food colors. Joseph Kohnstamm moved to New York City in the 1840s to expand his family business in synthetic dye trading in Germany to the American market. In 1851, he founded Kohnstamm & Company as an importer and supplier of dyes to the textile, printing, and paint industries. After Kohnstamm's death, he was succeeded by his brother, and later by his cousin who reorganized the firm and established H. Kohnstamm & Company in 1876. Four years later the company ventured into the manufacturing of synthetic dyes mainly for textiles and paints. H. Kohnstamm soon began developing food dyes and

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<sup>24</sup> Ibid., 7-11, 23; and L. F. Haber, *The Chemical Industry, 1900-1930: International Growth and Technological Change* (Oxford: Clarendon Press, 1971), 186. See also John J. Beer, *The Emergence of the German Dye Industry* (Urbana: University of Illinois Press, 1959); Anthony S. Travis, *Dyes Made in America, 1915-1980: The Calco Chemical Company, American Cyanamid and the Raritan River* (Jerusalem: Edelstein Center/Hexagon Press, 2004); and Travis, *The Rainbow Makers: The Origins of the Synthetic Dyestuffs Industry in Western Europe* (Bethlehem, PA: Lehigh University Press, 1993).

<sup>25</sup> See Mira Wilkins, *The History of Foreign Investment in the United States to 1914* (Cambridge, MA: Harvard University Press, 1989). For the history of globalization and roles of entrepreneurs and firms, see also Geoffrey Jones, *Entrepreneurship and Multinationals: Global Business and the Making of the Modern World* (Northampton, MA: Edward Elgar, 2013).

marketed them under the brand name “Atlas Colors.”<sup>26</sup> The firm used dye ingredients imported from Germany and refined them for the American food industry.

Another pioneer of food dye manufacturing was the Aniline & Chemical Company of Buffalo, New York. Its founder, Jacob Frederick Schoellkopf, was a foresighted businessman, who successfully expanded several different businesses, including tanning, flour milling, and dye manufacturing, in the United States. Trained as a tanner in Germany, he had little knowledge of synthetic dyes when he moved to the United States in 1842. Schoellkopf founded the Aniline & Chemical Company in 1879, to meet increasing demand for cheap synthetic dyes from the textile and paper industries. Schoellkopf was engaged primarily in management, and hired a German chemist to consult on the production of synthetic dyes with his two sons, who had studied chemistry in Germany. After Schoellkopf’s death in 1899, his sons incorporated the Schoellkopf, Hartford & Hanna Company in 1900 by consolidating three dye companies that Schoellkopf had established.<sup>27</sup> After the merger, the company began experimenting with food dye production. By the early 1910s, it had become the leading dye manufacturer in the United States, with a 50 percent share of the market, including both food and non-food dyes.<sup>28</sup>

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<sup>26</sup> H. Kohnstamm & Company, “The Development of Certified Pure Food Colors,” in *Chemical Industry’s Contribution to the Nation: 1635-1935*, ed. Williams Haynes and Edward L. Gordy (New York: Chemical Markets, 1935): 5-16; and “H. Kohnstamm & Co.,” *Oil, Paint and Drug Reporter Fifties Anniversary Number* 101, no. 14 (March 1922): 122.

<sup>27</sup> Three companies were Schoellkopf Aniline & Company; the Schoellkopf, Hartford, & Maclagen Company; and the Hanna-Schoellkopf Company. Schoellkopf established the latter two firms as sales companies to market Schoellkopf Aniline products.

<sup>28</sup> By 1910, the company had more than three hundred employees. Buffalo Evening News, *A History of the City of Buffalo: Its Men and Institutions: Biographical*

These German immigrant entrepreneurs realized the economic potential of dyes that could rival products imported from Germany. Imported dyes were subject to high tariffs; domestically produced colors hence would be significantly less expensive than German counterparts. Yet dye manufacturers in the United States faced vigorous competition with the German industry. German firms manipulated the American chemical market by charging high prices on certain dyestuffs not produced in the United States. In 1883, due to pressure from the textile and paper industries demanding inexpensive German dyes, Congress lowered imported duties for all dyestuffs significantly.<sup>29</sup> The tariff of 1883 forced at least nine synthetic dye plants to closure in the United States.<sup>30</sup> H. Kohnstamm and Schoellkopf managed to survive and expanded their businesses by relying on German resources, including imported dyestuffs, education, and human capital.<sup>31</sup>

H. Kohnstamm's food dyes were particularly popular in the confectionery industry – one of the largest consumers of synthetic dyes in the food industry. At the

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*Sketches of Leading Citizens* (Buffalo: Buffalo Evening News, 1908), 110; and Michael Brian Powers, "The Early Industrial Achievements of the Schoellkopf Family" (masters' thesis, Niagara University, 1979), 70; and Steen, *The American Synthetic*, 31.

<sup>29</sup> Powers, "Early Industrial Achievements," 67-68; and Benjamin Schwantes and Julianne Hornung, "Jacob Frederick Schoellkopf," *Immigrant Entrepreneurship: German-American Business Biographies*, German Historical Institute, January 6, 2014, accessed July 12, 2015, <http://www.immigrantentrepreneurship.org/entry.php?rec=188>.

<sup>30</sup> "Dr. Hesse on the Dyestuff Art: The President of the American Chemical Society as Historian and Prophet," *Bulletin of the National Association of Wool Manufacturers* 46, no. 3 (July 1916): 244.

<sup>31</sup> Blaszczyk, *The Color Revolution*, 20-44; and Steen, *The American Synthetic*, 31.

1906 annual convention of the National Confectioners' Association (NCA), the NCA's president "express[ed] gratitude" to H. Kohnstamm for its "persistent and highly intelligent efforts to overcome the prejudices of Public Officials against the use of harmless coal tar colors."<sup>32</sup> The NCA's Executive Committee also recognized the firm's "constant, able and scientific work" in the interest of the confectionery industry. The Executive Committee endorsed and recommended that NCA members use H. Kohnstamm's food colors, which had "always properly defend[ed] any attacks on the quality of confectionery where the coloring [was] questioned."<sup>33</sup> Confectioners were eager to eradicate government officials' and consumers' "prejudices" against dyes used for their products, incited by newspapers reporting a number of incidents where brightly colored candies caused children's illness and sometimes death. Although confectioners vehemently denied that their products were injurious to health, medical professionals and government scientists asserted the toxicity of dyes used for confectionery, particularly inexpensive candies.<sup>34</sup>

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<sup>32</sup> "The President's Address, Proceedings of the Twenty-Third Annual Convention of the National Confectioners' Association of the United States," *Confectioners Journal* 32, no. 379 (August 1906): 65.

<sup>33</sup> "The President's Address," 68. See also H. Kohnstamm Advertisement, *Confectioners' and Bakers' Gazette* 27, no. 300 (September 1906): 31; and "National Confectioners' Association Convention," *Confectioners' and Bakers' Gazette* 27, no. 299 (August 1906): 21.

<sup>34</sup> "A Clinical Analysis," 51, 27; "Boy Killed by Candy," *Confectioners Journal* 32, no. 372 (January 1906): 70; "Girl Is Dead," *Confectioners Journal* 32, no. 378 (July 1906): 89; "Mother and Children Poisoned by Candy," *Confectioners Journal* 32, no. 375 (April 1906): 70; "Poison for Food Coloring," *New York Times (NYT)*, October 14, 1903; "Poison in a Stick of Red Candy Kills Boy," *Confectioners Journal* 32, no. 379 (August 1906): 107; and "Poisoned Candy Killed Child," *Confectioners Journal* 32, no. 375 (April 1906): 71.

Confectioners did demand for “harmless” colors, however, and in response H. Kohnstamm and other dye producers supplied various new food dyes to the confectionery industry, claiming that their dyes were safer, purer, and more reliable than any other brands (Fig.3).<sup>35</sup> When the NCA acknowledged H. Kohnstamm’s “intelligent efforts” for the industry at the 1906 annual convention, the company publicized the endorsement from the NCA in the trade journal *Confectioners’ and*



Figure 3 H. Kohnstamm & Co., advertisement. *Confectioners Journal*, January 1906.

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<sup>35</sup> H. Kohnstamm Advertisement, *Confectioners Journal* 32, no. 372 (January 1906).

*Bakers' Gazette*, seeking to demonstrate that H. Kohnstamm was the leader of harmless synthetic dye manufacturing.<sup>36</sup>

For many food manufacturers, synthetic dyes became one of the crucial ingredients to make foods look enticing during the first decades of the twentieth century. A 1906 article in the *Confectioners Journal* described the coloring of foods as “the natural and reasonable adornment of a product.” The author noted that because people were surrounded by color in their everyday lives, it was “natural” for confectioners to “find it necessary to tint [their] various creations in pleasing shades.”<sup>37</sup> While confectioners used synthetic dyes mainly for decorative purposes to give rainbow colors to confection, other food manufacturers added colors to make foods look “natural” and “fresh.” A 1905 meat-packing manual advised butchers to mix red dyes with sausage stuffing or soak casing in color solution to give the finished product “a heavy, smoked appearance” and a “wholesome” look.<sup>38</sup> As food producers attained economical and convenient ways of coloring foods, creating and controlling the visual appeal of taste became not only necessary for profitable sales but also relatively simple.

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<sup>36</sup> H. Kohnstamm Advertisement, *Confectioners' and Bakers' Gazette* 27, no. 300 (September 1906): 31. See also “A Defense of Colorings,” *Confectioners Journal* 32, no. 375 (April 1906): 72; and “Pure Colors,” *Confectioners' and Bakers' Gazette* 27, no. 298 (July 1906): 14.

<sup>37</sup> “To Catch the Eye,” *Confectioners Journal* 32, no. 380 (September 1906): 96.

<sup>38</sup> F. W. Wilder, *The Modern Packing House* (Chicago: Nickerson and Collins, 1905), 356. See also B. Heller & Co., *Secrets of Meat Curing and Sausage Making: How to Cure Hams, Shoulders, Bacon, Corned Beef, Etc., and How to Make All Kinds of Sausage, Etc., and Comply with All Pure Food Laws* (Chicago: B. Heller, 1908), 124, 126, 150.

### **The Creation of the Certified Dye Business**

The increasing use of food dyes and other chemicals, both toxic and harmless, aroused consumers' suspicion about food safety. Popular media, scientists, and domestic scientists helped educate the public about food poisoning and adulteration. In its 1903 article, entitled "Poison for Food Coloring," the *New York Times* reported that the Port of San Francisco denied the importation of synthetic dye "cherry fruit color" from Germany as it contained poisonous substances.<sup>39</sup> The *Chicago Tribune* published a speech by Senator Weldon Heyburn, who introduced a pure food bill to Congress, and alleged that "a large proportion of foods, drugs, and liquors were adulterated."<sup>40</sup> Harvey Wiley, the Chief of the Bureau of Chemistry in the U.S. Department of Agriculture (USDA), advocated the necessity of food regulation by publishing articles in popular and trade magazines and lecturing around the country. Wiley appeared in popular media so frequently that by 1905, "Dr. Wiley" had become a household name in the United States.<sup>41</sup>

In June 1906, after nearly thirty years of political battle, Congress finally passed the Pure Food and Drug Act, which prohibited the coloring of foods without labeling to conceal damage or inferiority and the addition of poisonous substances to confectionery (partly due to the frequent use of deleterious ingredients in candies at

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<sup>39</sup> "Poison for Food Coloring," 8.

<sup>40</sup> "Make Plea for Pure Food," *Chicago Tribune*, April 7, 1904. See also L. D. H., "Poisonous Dyes Found in Food and Drink," *Washington Post*, December 31, 1905; "Pure Food Advocates Leave Little to Eat," *NYT*, December 3, 1905; and "Pure Food in Massachusetts," *Boston Cooking School Magazine of Culinary Science and Domestic Economics*, March 1904, 399.

<sup>41</sup> Carpenter, *Forging of Bureaucratic Autonomy*, 2.



the time).<sup>42</sup> The act signified the beginning of national food regulation as well as the rise of one of the most powerful government agencies – the Food and Drug Administration (FDA).<sup>43</sup> It was not until the 1938 amendment of the 1906 act that the FDA gained the sole authoritative power over food and drug regulation. Yet under the 1906 act, the USDA's Bureau of Chemistry (the predecessor of the FDA) played an important role in food dye regulation. The Bureau served not simply as a gatekeeper but also as a federal agency responsible for investigating dyes and other food additives and establishing standards of scientific evidence.

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<sup>42</sup> Federal Food and Drugs Act of 1906, 21 U.S.C. §7 (1934) (repealed in 1938). Since the late nineteenth century, confectionery had been the primary target of food regulation in many states. Prior to the passage of the 1906 federal act, thirty-nine states had enacted special confectionery provision within their food laws or entirely separate regulation on confectionery. The regulation of confectionery as a distinct category reflected not only the fact that many inexpensive candies contained poisonous substances but also the general conception of “food” in early-twentieth-century American culture. The 1906 Pure Food Act defined “food” as “all articles used for food, drink, confectionery, or condiment by man or other animals, whether simple, mixed, or compound.” Legislators and the public at the time generally considered confectionery, as well as condiments, distinct from “food.” “Food” meant something that had nutritive value. Hence legislators specified confectionery and condiments, as well as drink, as part of the “food” category to regulate them under the 1906 act. Lewis A. Grossman, “Food, Drugs, and Droods: A Historical Consideration of Definitions and Categories in American Food and Drug Law,” *Cornell Law Review* 93 (5) (July 2008): 1098-1103. See also Xaq Frohlich, “Accounting for Taste: Regulating Food Labeling in the ‘Affluent Society,’ 1945-1995” (PhD diss., Massachusetts Institute of Technology, 2011); and Samira Kawash, *Candy: A Century of Panic and Pleasure* (New York: Faber and Faber, 2013), 11-14, 95-123, 152-78.

<sup>43</sup> See Daniel Carpenter, *Reputation and Power: Organizational Image and Pharmaceutical Regulation at the FDA* (Princeton: Princeton University Press, 2010); and Lisa Mae Robinson, “Regulating What We Eat: Mary Engle Pennington and the Food Research Laboratory: Agricultural History,” *United States Department of Agriculture in Historical Perspective* 64, no. 2 (Spring 1990): 143-153.

The 1906 act, however, did not specify which dyes were considered poisonous or harmless. Although dye manufacturers commonly advertised “purity” and “safety” as key features of their food colors, the meaning of these words depended on each manufacturer. Without legal definition or standard for “harmless” and “safe” dyes, many food producers needed to rely primarily on the reputation of a dye brand, professionals’ and authorities’ advice, and their own experience from business operations to assess which dyes were “pure” and “safe.”

In the summer of 1906, a few months after the passage of the Pure Food Law, the Bureau of Chemistry began conducting investigations on color additives to determine which dyes were safe for food use. As there was no expert on food dyes in the Bureau, Chief of the Bureau of Chemistry Harvey Wiley appointed chemist Bernhard Hesse as an outside consultant for the Bureau’s New York laboratory. Hesse had earned a doctorate in chemistry from the University of Chicago in 1886. Before he started working for the USDA, Hesse had served as a research chemist for Badische Anilin and Soda Fabrick (BASF), one of the largest German chemical companies, from 1896 to 1906.<sup>44</sup> He served as an important bridge between the federal government and the dye industry until he left his government job in December 1915 to work as a research consultant for the General Chemical Company in New York City.<sup>45</sup>

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<sup>44</sup> “Bernhard C. Hesse,” *Oil, Paint and Drug Reporter* 91, no. 7 (February 9, 1917): 7; F. B. Linton to Enterprise Chemical Company, 17 February 1919, box 55, entry 1001, RG 88, NACP; and Carl L. Alsberg to Harmon Color Works, Inc., 13 March 1919, box 55, entry 1001, RG 88, NACP.

<sup>45</sup> American chemist William Henry Nichols, along with his son Charles W. Nichols, founded General Chemical Company by combining twelve chemical firms in 1899. In 1920, they merged the firm with other four chemical companies, including National Aniline & Company (the successor of Schoellkopf, Hartford and Hanna Company), to

In June 1907, the USDA issued Food Inspection Decision 76, which certified seven synthetic dyes as safe for food use, based on Hesse's investigations.<sup>46</sup> He selected the seven colors not only because he considered them harmless but also because they were "most heavily used" by the dye and food industries. Since these dyes covered "yellow, orange, blue, green, red, bluish scarlet, and brilliant cherry red," food manufacturers could create virtually any hue by mixing them.<sup>47</sup> To have dyes certified, dye makers were required to submit each batch (a single lot of dye processed at one time) separately, along with an affidavit specifying the ingredients in the proposed mixture, the weight of each ingredient, the total weight of the batch, and the method of mixing. Scientists in the Bureau of Chemistry then investigated whether the dyes submitted met the USDA's quality standard. If the seal on a package of certified colors was broken, the contents were no longer considered "certified." If certified colors were mixed with liquid or other dyes (certified or uncertified), manufacturers had to resubmit the finished product for certification.<sup>48</sup>

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create the Allied Chemical & Dye Company, which became one of the largest chemical firms in the United States.

<sup>46</sup> USDA, Office of the Secretary, Food Inspection Decision 76, "Dyes Chemicals and Preservatives in Foods," July 13, 1907. The seven dyes were Amaranth, Ponceau 3R, Erythrosin, Orange I, Naphthol Yellow S, Light Green S F Yellowish, and Indigo disulfoacid. See also R. K. Johnson and F. J. Lichtenberger, "Synthetic Certified Food Colours of the USA," in *Developments in Food Colours* Vol. 2, ed. John Walford (New York: Elsevier Applied Science Publishers, 1984), 113-57.

<sup>47</sup> Hesse, "Coal-Tar Colors," 28.

<sup>48</sup> R. L. Emerson to Greever-Lotspeich Manufacturing Co., 11 June 1915, box 7, entry 60, Records of the Bureau of Agricultural and Industrial Chemistry, RG 97, NACP; and "The Color Laboratory," box 1, entry 62, RG 97, NACP. See also Sheldon Hochheiser, "Synthetic Food Colors in the United States: A History under Regulation" (PhD diss., University of Wisconsin-Madison, 1984): 32-33.

The USDA, however, did not require the use of certified dyes for foods. The 1906 act prohibited the use of poisonous substances in confectionery. Yet there were so many dyestuffs on the market that it was virtually impossible for the Bureau of Chemistry to investigate every single dye and determine which colors were unsafe for food consumption. It was lawful to use uncertified dyes as long as the addition of coloring matter was marked on labels and colors used for confectionery were not proved to be injurious to health.<sup>49</sup> It was not until the amendment of the 1906 act in 1938 that the USDA mandated the certification of food dyes.

Because none of the seven certified colors was patented, their manufacture was open to any producer competent to make them.<sup>50</sup> Until the early 1920s, however, only two American dye producers, H. Kohnstamm & Company and the Schoellkopf, Hartford & Hanna Company, were involved in the manufacturing of certified food dyes. Some dye makers did not see the certified dye business as profitable.<sup>51</sup> Others were not able to manufacture high quality certifiable dyes due to a lack of sufficient technology. The quality standard for dyes was based primarily on their purity. Because most synthetic food dyes were produced from by-products of coal processing (hence so-called coal-tar colors), they contained substances such as poisonous metallic salts, sulfated ash, and arsenic derived from coal-tar. During the distilling and purifying

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<sup>49</sup> Bernhard C. Hesse to Harvey W. Wiley, 2 December 1909, box 321, entry 8, RG 97, NACP; and Hochheiser, "Synthetic Food Colors," 50.

<sup>50</sup> Hesse, "Coal-Tar Colors," 13.

<sup>51</sup> Hesse to Wiley, 21 March 1908, box 160, entry 8, RG 97, NACP.

processes, these impurities were removed from the dye mixture.<sup>52</sup> The Bureau of Chemistry's purity requirement for dye certification was so high that many dye makers could not meet the standard. The Bureau had rejected one of the first samples submitted by Schoellkopf, because it contained 0.09 percent of impure substances; the Bureau's purity standard was 0.05 percent.<sup>53</sup>

The confectionery industry was one of the first industries that H. Kohnstamm approached as a major outlet for its certified colors. In December 1907, the firm published an advertisement in *Confectioners' and Bakers' Gazette* to inform confectioners as to the newly established certification system, and announced that the company was about to complete the development and manufacturing of certified colors.<sup>54</sup> But it took H. Kohnstamm and its rival Schoellkopf two more years to manufacture certified dyes successfully on a commercial scale. In 1909, the two firms launched promotion campaigns to notify food and beverage producers and other dye makers that they were accepting orders for the seven certified colors.<sup>55</sup> "The

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<sup>52</sup> Irving W. Fay, *The Chemistry of the Coal-Tar Dyes*, 2nd ed. (New York: D. Van Nostrand, 1919).

<sup>53</sup> Hesse to Wiley, 8 December 1908, box 160, entry 8, RG 97, NACP. See also Hesse to Wiley, 23 November 1908, box 160, entry 8, RG 97, NACP; and Hesse to Wiley, 1 December 1909, box 321, entry 8, RG 97, NACP.

<sup>54</sup> H. Kohnstamm Advertisement, *Confectioners' and Bakers' Gazette* 29, no. 315 (December 1907): 111.

<sup>55</sup> H. Kohnstamm Advertisement, *Ice Cream Trade Journal* 5, no. 2 (February 1909): 4; and Hesse to Wiley, 23 September 1909, box 720, entry 8, RG 97, NACP. See also Hochheiser, "Synthetic Food Colors," 33-34, 42; and Daniel M. Marmion, *Handbook of U.S. Colorants: Foods, Drugs, Cosmetics, and Medical Devices* (New York: John Wiley & Sons, 1991), 10.

advertising advantage to those using Certified Colors can readily be seen,” H. Kohnstamm noted in its advertisement, featured in the trade magazine *American Food Journal*.<sup>56</sup> To promote the use of certified dyes, both companies explained the introduction of Food Inspection Decision 76 and asserted that government certification would serve as a marker of food quality and safety (Fig.4).<sup>57</sup>



Figure 4 H. Kohnstamm food color pamphlet for confectioners, August 1909. National Archives, College Park, MD.

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<sup>56</sup> H. Kohnstamm Advertisement, *American Food Journal* 4, no. 2 (February 1909): 31. See also “Certified Colors,” *American Food Journal* 4, no. 12 (December 1909): 18; “Certified Colors Now on the Market,” *American Food Journal* 4, no. 2 (February 1909): 24; and H. Kohnstamm, “The Development,” 32.

<sup>57</sup> H. Kohnstamm Pamphlet, August 19, 1909, box 321, entry 8, RG 97, NACP.

The sales of the certified colors disappointed H. Kohnstamm and Schoellkopf, however. They complained to USDA chemist Bernhard Hesse that the business in certified colors was “very slack” and that food and dye makers would not “take to them unless some pressure [was] brought to bear.”<sup>58</sup> H. Kohnstamm initially had believed that without any government pressure, certified food colors would displace uncertified dyes once they became available in greater quantities.<sup>59</sup> In February 1909, the company’s president E. G. Kohnstamm told Hesse that he was “surprised how little interest his announcement of [1909] with respect to certified food colors [had] awakened” and suggested that requiring certified food colors might be necessary.<sup>60</sup> Hesse proposed to Chief of the Bureau of Chemistry Harvey Wiley repeatedly that certified food colors should be mandatory.<sup>61</sup> Frustrated by the slowness of USDA officials, Hesse wrote to Wiley: “Unless there are reasons unknown to me, I can not see why it would not be proper to give some official notice that on and after, say, March 1, 1910, nothing but certified colors could be used.”<sup>62</sup>

Anti-monopoly and *laissez-faire* ideals in Progressive-era political culture hindered the USDA from establishing more stringent means of regulating food colors. USDA officials were not willing to require the use of certified dyes on the grounds

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<sup>58</sup> Hesse to Wiley, 19 October 1909, box 321, entry 8, RG 97, NACP. See also Hesse to Wiley, 2 December 1909, box 321, entry 8, RG 97, NACP; and Hesse to Wiley, 16 December 1909, RG97, entry 8, box 321, NACP.

<sup>59</sup> Hesse to Wiley, 25 August 1909, box 321, entry 8, RG 97, NACP.

<sup>60</sup> Hesse to Wiley, 9 February 1909, box 321, entry 8, RG 97, NACP.

<sup>61</sup> Hesse to Wiley, 19 October 1909; and Hesse to Wiley, 2 December 1909.

<sup>62</sup> Hesse to Wiley, 2 December 1909.

that there were only two manufacturers who supplied certified colors. They believed that if the use of certified dyes was mandated, there would be a monopoly in the certified dye business.<sup>63</sup> Hesse bitterly opposed this idea. In describing H. Kohnstamm as “the real pioneer in this certifying business,” Hesse contended that the firm had “done nothing but what [was] open to every body else in this wide world to do.” Neither H. Kohnstamm’s nor Schoellkopf’s certified dye business should be considered a monopoly, insisted Hesse, since other dye makers simply “remain[ed] idle” despite an opportunity to enter the market.<sup>64</sup> USDA officials were not convinced. They also asserted that the government did not have power to limit free trade or prohibit the use of commercial goods that had not been proven harmful.<sup>65</sup>

In May 1910, H. Kohnstamm sent out a circular to food manufacturers to “boom Certified Color.” Referring to a macaroni manufacturer accused of coloring its products with harmful dyes, H. Kohnstamm explained to its customers that it was necessary “to use the Certified Colors in order to be sure that one [would] have no trouble with the National and various State Officials.”<sup>66</sup> Around the same time, the Bureau of Chemistry issued Food Inspection Decision 117 to announce to food producers that the federal government strongly recommended certified dyes for coloring foods:

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<sup>63</sup> Hesse to Wiley, 28 February 1908, box 321, entry 8, RG 97, NACP; Hesse to Wiley, 21 March 1908, box 160, entry 8, RG 97, NACP; and Hesse to Wiley, 19 July 1909, box 321, entry 8, RG 97, NACP.

<sup>64</sup> Hesse to Wiley, 28 February 1908.

<sup>65</sup> Hesse to Wiley, 19 July 1909.

<sup>66</sup> H. Kohnstamm & Co. Circular, May 1910, box 720, entry 8, RG 97, NACP. See also H. Kohnstamm & Co. to Hesse, 23 May, 1910, box 720, entry 8, RG 97, NACP.



Certified dyes are now on the market. Certified dyes may be used in foods without objection by the Department of Agriculture, provided the use of the dye in food does not conceal damage or inferiority. If damage or inferiority be concealed by the use of the dye, the food is adulterated. Uncertified coal-tar dyes are likely to contain arsenic and other poisonous material, which, when used in food, may render such food injurious to health and, therefore, adulterated under the law. In all cases where food subject to the provisions of the Food and Drugs Act of June 30, 1906, are found colored with dyes which contain either arsenic or other poisonous or deleterious ingredients which may render such foods injurious to health, the case will be reported to the Department of Justice and prosecutions had.<sup>67</sup>

Although the Bureau still did not mandate the use of certified colors, it suggested a high risk of violating the law by using uncertified dyes. In the *American Food Journal*, the Food Commissioner of Iowa urged food processors to use only certified colors, as a means of combatting popular suspicions of the dangers of synthetic colors. He argued that there could be “no better rebuttal than colors the U.S. Government itself had guaranteed as safe.”<sup>68</sup> Although uncertified dyes were still around on the market, the promotion of certified dyes by the manufacturers and by government officials gradually led food producers to discard uncertified colors for certified dyes. By the early 1910s, H. Kohnstamm and Schoellkopf began receiving orders regularly from food and beverage producers.<sup>69</sup>

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<sup>67</sup> USDA, Office of Secretary, FID 117, “The Use of Certified Colors,” May 3, 1910.

<sup>68</sup> H. R. Wright, “The Adulteration of Candy,” *American Food Journal* 7, no. 3 (March 1912): 2.

<sup>69</sup> Hochheiser, “Synthetic Food Colors,” 52-53.

### **The Expansion of the Food Dye Market**

While some dye makers replaced uncertified dyes with certified, others turned to natural colors instead of synthetic ones. By the 1910s, many butter color makers had switched back to annatto color extracts.<sup>70</sup> To promote annatto butter colors, the Christopher Hansen's Laboratory Company noted in its 1907 advertisement that "purely vegetable annatto color has again forged to the front as the only reliable coloring medium for fine butter" as "Pure Food became the watch word in all quarters of the country."<sup>71</sup> Wells, Richardson & Company also advertised its butter color as "purely vegetable, which met "the full requirements of all food laws – state and national." While stressing its products as harmless, Wells, Richardson also claimed that its "Vegetable Butter Color [was] even better than" synthetic dyes as regards to coloring property.<sup>72</sup> By referring to the Federal Pure Food Law, butter color makers sought to ensure their customers of the safety and purity of their products. Moreover, to compete against synthetic dyes, which were usually less expensive and stronger in hue than natural dyes, butter color manufacturers stressed that their natural, harmless products were as uniform and bright as coal-tar based colors.

Government regulation and public concerns over food adulteration reallocated the competitive advantage that synthetic dye makers and food processors had

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<sup>70</sup> "Abolishing Coal Tar Colors," 2; "Butter Color Poison," 3; and Blanck to Murray. See also Guthrie, *The Book of Butter*, 149; and Hunziker, *Butter Industry*.

<sup>71</sup> Christopher Hansen Advertisement, *Dairy Record* 8, no. 1 (May 29, 1907): 7. See also Christopher Hansen Advertisement, *Dairy Record* 8, no. 5 (June 26, 1907): 27.

<sup>72</sup> "Trouble with His Butter Color," *Elgin Dairy Report* 13, no. 44 (April 4, 1904): 1.

retained.<sup>73</sup> When synthetic dyes were introduced to the American food industry in the late nineteenth century, many dye and food producers abandoned natural colors as uneconomical, while synthetic dyes symbolized modern industrial development. Technological and scientific advances in the chemical industry afforded synthetic dye makers and users a competitive edge over their competitors, allowing them to color their products economically, conveniently, and consistently. By the 1910s, however, due to changes in the political and social climate, natural dye became an important commodity as a “safe” coloring material. Synthetic dyes were still used more widely by food producers than natural colors and remained highly competitive in the dye market. Yet after the passage of the 1906 act, as purity and harmlessness became even more important features of food colors than before, the economic and cultural significance and commercial value of natural dyes increased. After annatto regained popularity among some dye and food producers (particularly butter makers), the amount of annatto seeds shipped from Jamaica to the American market increased, from 364,000 pounds in 1887 to 914,000 pounds in 1935.<sup>74</sup> By the mid-twentieth

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<sup>73</sup> For food manufacturers’ competitive advantage at the turn of the twentieth century, see Wood, *Strategic Uses*, 177-80.

<sup>74</sup> “Annatto,” Royal Gardens (September 1887), 4; Georgia E. Cantrell, *Annatto* (Washington, D.C.: U.S. War Food Administration, Office of Distribution, 1944), 16; “Cultural Exports and Imports,” *Bulletin of the Botanical Department Jamaica* 24, no. 39 (January 1893): 19; “Cultivation and Utilization of Annatto,” *Bulletin of the Imperial Institute* 6 (1908): 171; and Evans, *Quarterly Bulletin*, 5. See also Donkin, “Bixa Orellana”; and R. A. Donkin, “Spanish Red: An Ethnogeographical Study of Cochineal and the Opuntia Cactus,” *Transactions of the American Philosophical Society, New Series* 67, no. 5 (1977): 6-7.

century, the United States became the world's largest importer of annatto, representing approximately one-fourth of the total global trade.<sup>75</sup>

Not only did the significance of natural colors change, but the government's view about "safe" synthetic dyes also shifted, due to the dye industry's strong demand for certain colors and state officials' reinterpretation of "harmlessness." In August 1907, a few months after the Bureau of Chemistry issued Food Inspection Decision 76, the president of Heller & Merz Company, one of the leading American dye manufacturers, complained to the Bureau that none of the certified dyes would give butter and cheese a satisfactory shade. The Bureau had certified only water-soluble synthetic colors as safe for food use, and they were not useful for coloring oil products. Heller & Merz requested the certification of oil-soluble dyes, specifically the firm's Yellow AB and Yellow OB, which had been used extensively for coloring butter, cheese, and margarine.<sup>76</sup> According to the president of Heller & Merz, the two dyes were "the most desirable yellows for coloring butter and other fats" while other yellow dyes' oil solubility was not satisfactory.<sup>77</sup> Food and dye producers demanded both Yellow AB and Yellow OB. The two dyes created similar yellow hues, but they were not identical. Yellow AB alone was "too much of a lemon shade" and Yellow

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<sup>75</sup> In the late twentieth century, Japan became the largest annatto importer, followed by the United States. F. J. Francis, "Lesser-Known Food Colorants," *Food Technology* 41 (April 1987): 62. See also Cantrell, *Annatto*, 9.

<sup>76</sup> Alsberg to Heller & Merz Company, 22 March 1916, box 7, entry 60, RG 97, NACP; and Hochheiser, "Synthetic Food Colors," 61. The chemical name for Yellow AB was "aniline azo beta naphthylamine" and Yellow OB was "ortho toluidine azo beta naphthylamine."

<sup>77</sup> Heller & Merz to Alsberg, 11 January 1916, box 15, Special File (SF) 73, RG 88, NACP.

OB was “too orange”; it was hence essential to mix the two dyes to make a desirable butter color.<sup>78</sup>

The definition and understanding of “safety” and “purity” differed among researchers and government officials. Chief of the Bureau of Chemistry Harvey Wiley considered the addition of almost any substances to foods as “adulteration.”<sup>79</sup> In his talk at the 1905 Conference of Sanitary Officers, Wiley argued that the “idea of adding an artificial color to food [was] to cause a food product to imitate a natural product of higher quality.” He particularly criticized the artificial coloring of butter, which led to the “corruption of the public taste,” since many consumers had become accustomed to butter of unnaturally rich yellow color.<sup>80</sup> The Bureau’s dye expert Bernhard Hesse did not necessarily oppose food coloring practices. Yet after years of research he came to the conclusion that no oil-soluble colors were harmless. He thus did not include Yellow AB or Yellow OB in the list of certified dyes.<sup>81</sup>

In 1912, when Carl Alsberg succeeded to Wiley’s position and became the Chief of the Bureau of Chemistry, he began conducting a new investigation of oil-

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<sup>78</sup> August Merz to H. D. Gibbs, 25 October 1916, box 15, SF 73, RG 88, NACP.

<sup>79</sup> For Wiley’s work in the USDA and his relationships with industry, see Coppin and High, *Politics of Purity*; and James Harvey Young, *Pure Food: Securing the Federal Food and Drugs Act of 1906* (Princeton: Princeton University Press, 1989).

<sup>80</sup> Harvey W. Wiley, “The Attitude of the Health Official toward Food Adulteration,” *Medical Review of Reviews* 11, no. 5 (May 25, 1905): 424-25. See also Harvey W. Wiley, *Foods and Their Adulteration: Origin, Manufacture, and Composition of Food Products; Infants’ and Invalids’ Foods; Detection of Common Adulterations* (Philadelphia: P. Blakiston’s Son, 1917), 313.

<sup>81</sup> Hochheiser, “Synthetic Food Colors,” 61.

soluble colors and their suitability for food use, suspecting their toxicity.<sup>82</sup> A researcher at the USDA's Pharmacological Laboratory reported that after feeding rabbits one to two grams of Yellow AB or OB, the animals died in four to nine days due to "loss of appetite." When only twenty-five to forty milligrams of the same dyes were given to rats for four and a half months, there was no sign of health effects.<sup>83</sup> According to USDA chemists' calculation, the maximum amount of these colors that a human would consume in butter was ten milligrams per day.<sup>84</sup> They hence concluded that the single dose required to cause any effect was so large that neither Yellow AB nor Yellow OB was detrimental to human health as long as consumers maintained normal eating habits.<sup>85</sup> One of the chemists even contended that the two dyes were "the best colors" not only because they were relatively "harmless" compared to other yellow dyes, but also because they were "sufficiently soluble in oil."<sup>86</sup> In 1918, convinced by the research data, Alsberg decided to add the two dyes to the certified list.<sup>87</sup> By 1931, the Bureau of Chemistry had increased the number of certified colors to fifteen synthetic dyes.<sup>88</sup>

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<sup>82</sup> Ibid., 60-61.

<sup>83</sup> William Salant to Alsberg, 31 July 1916, box 15, SF 73, RG 88, NACP.

<sup>84</sup> Gibbs to Alsberg, 15 July 1916, box 15, SF 73, RG 88, NACP.

<sup>85</sup> Salant to Alsberg, 31 July 1916.

<sup>86</sup> Gibbs to Alsberg, 4 December 1916, box 15, SF 73, RG 88, NACP. See also Gibbs to Alsberg, 10 December 1916 and Gibbs to Alsberg, 27 December 1916, box 15, SF 73, RG 88, NACP.

<sup>87</sup> Alsberg to Gibbs, 14 July 1916, box 15, SF 73, RG 88, NACP; Alsberg to Walter G. Campbell, 12 January 1917, box 15, SF 73, RG 88, NACP; Alsberg to Heller & Merz, 22 March 1916, box 7, entry 60, RG97, NACP; and P. B. Dunbar to

The shift in the federal government's food safety policies, including the expansion of the certified dye list, and the growth of food coloring businesses reflected drastic changes in global and domestic conditions surrounding the chemical industry. During the 1910s and 1920s, the transatlantic political economy and the vertical integration of dye firms reshaped the American chemical industry. Before World War I, American dye manufacturers had relied on the import of dyestuffs and raw materials for dye production from Germany, which accounted for almost 90 percent of the world dye production.<sup>89</sup> In 1914, the total dye importation to the United States amounted to about 46 million pounds, compared to domestic production of 6.6 million pounds.<sup>90</sup> As Britain tightened the blockade during the war, American dye companies could no longer import sufficient dye materials from Germany. The

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Kirschbraun and Sons, Inc., 20 September 1922, box 340, entry 1001, RG 88, NACP. See also Hochheiser, "Synthetic Food Colors," 61-62, 64-66.

<sup>88</sup> Alsberg to Jos. F. H. Harold, 2 December 1919, box 55, entry 1001, RG88, NACP. See also Hochheiser, "Synthetic Food Colors," 6; Gordon C. Inskeep and W. H. Kretlow, "Certified Food Colors," *Journal of Industrial and Engineering Chemistry (JIEC)* 44, no. 1 (January 1952): 14; Herbert A. Lubs, "Detection of Added Color in Butter or Oleomargarine," *JIEC* 10, no. 6 (June 1918): 436-39; Walter E. Mathewson, "The Detection and Estimation of Yellow AB and Yellow OB in Mixtures," *JIEC* 12, no. 9 (September 1920): 883-87; and William Salant and Robert Bengis, "Physiological and Pharmacological Studies on Coal Tar Colors," *Journal of Biological Chemistry* 27, no. 2 (September 1916): 403-27.

<sup>89</sup> "The Dyestuff Industry," *American Economist* 58, no. 25 (December 22, 1916): 298; and Mira Wilkins, "German Chemical Firms in the United States from the Late Nineteenth Century to the Post-World War II Period," in *The German Chemical Industry in the Twentieth Century: Chemists and Chemistry*, ed. John E. Lesc (Norwell, MA: Kluwer Academic, 2000), 285-322.

<sup>90</sup> "The Color Laboratory," box 1, entry 62, RG 97, NACP.

development of a strong domestic dye industry became an urgent necessity for the industry as well as for the federal government.<sup>91</sup>

After the outbreak of the war, state-industry relationships became institutionalized. In 1916, Congress appropriated \$50,000 to establish the Color Laboratory in the Bureau of Chemistry to investigate and regulate dyes produced and used in the United States. One of the primary objectives in establishing the Color Laboratory was to assist and cooperate with American chemical companies “in every way possible” by “avoiding any direct competition with the commercial laboratories.”<sup>92</sup> The Color Laboratory became responsible for the certification of food dyes, and provided government control and supervision over food dye manufacturing.<sup>93</sup> To support the chemical industry in dye investigations and

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<sup>91</sup> “Analysis of the Coal-Tar Dye Industry,” *JIEC* 6, no. 12 (December, 1914): 972; Bernhard C. Hess, “The Industry of the Coal-Tar Dyes: An Outline Sketch,” *JIEC* 6, no. 12 (December 1914): 1013-27; Bernhard C. Hesse, “Lest We Forge! Who Killed Cook Robin? The U.S. Tariff-History of Coal-Tar Dyes,” *JIEC* 7, no. 8 (August 1915): 694; O. P. Hopkins, “Effect of the War on American Chemical Trade,” *JIEC* 10, no. 9 (September 1918): 692-700; and “Symposium on American Dye Industry,” *JIEC* 6, no. 11 (November 1914): 941-53. See also Blaszczyk, *The Color Revolution*, 71-74; and Haber, *Chemical Industry*, 185.

<sup>92</sup> “The Color Laboratory.”; Gibbs to American Aniline Products, 21 June 1917, box 1, entry 60, RG 97, NACP; and Gibbs to C. H. Christman, 1 December 1917, box 1, entry 60, RG 97, NACP.

<sup>93</sup> The Color Laboratory was located in Washington, D.C., and a technical plant was later constructed in Arlington, Virginia. Gibbs to Alsberg, 8 January 1916, box 2, Color Lab Special File (CLSF), entry 2, RG 97, NACP; and H. T. Herrick, “The Contribution of the Color Laboratory to Industry,” *JIEC* 18, no.2 (December 1926): 1334. See also Joseph A. Ambler, “The Work of the Color Laboratory,” *JIEC* 15, no. 9 (September 1923): 970; and H. D. Gibbs, “The Color Laboratory of the Bureau of Chemistry: A Brief History of Its Objects and Problems,” *JIEC* 10, no. 10 (October 1918): 802.



production, the Laboratory compiled American dye patents and loaned manuscript copies to industry. The Laboratory's chemists also undertook the manufacture of commercial dye products that were not produced by dye companies due to a lack of technological or financial resources.<sup>94</sup> The Color Laboratory centralized the research on food dyes and functioned as a government agency that helped develop, as well as oversee, the American food dye industry.<sup>95</sup>

During and after World War I, American chemical companies sought to ensure and increase domestic dye production by expanding their businesses through mergers and by creating new firms.<sup>96</sup> By the end of the war, Schoellkopf had become the largest dye manufacturer in the United States. In 1917, the company merged with six other dye makers and established the National Aniline & Chemical Company, with nearly 60 percent of market share.<sup>97</sup> In 1921, National Aniline joined with several other companies to become the Allied Dyes & Chemical Corporation, which

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<sup>94</sup> Herrick, "Contribution," 1334.

<sup>95</sup> Gibbs to American Aniline Products, 21 June 1917, box 1, entry 60, RG 97, NACP; and Gibbs to C. H. Christman, 1 December 1917, box 3, entry 60, RG 97, NACP.

<sup>96</sup> For instance, in 1916, three American chemists established New York Color & Chemical Company to supply dyestuffs. Calco Chemical Company was also founded in 1916 as a subsidiary of textile company Cott-A-Lap Company and supplied primarily dye intermediates, necessary ingredients for manufacturing synthetic dyes. Calco Chemical was acquired by American Cyanamid Company in 1929. The Kohnstamm family continued to operate H. Kohnstamm & Company until 1988 when the firm was acquired by Sensient Technologies Corporation, one of the largest food dye and flavor manufacturers today.

<sup>97</sup> "Germany's Grip on U.S. Dye Market," *Drug & Chemical Markets* 5, no. 28 (March 1919): 12; and "New Dyestuff Factor," *Textile World Journal* 53, no. 13 (September 1917): 63.

encompassed all necessary processes from raw materials to finished product. Allied became the second largest chemical company after DuPont and produced not only synthetic dyes but also a variety of organic chemical products. Since Allied was a holding company, its constituent parts retained their separate corporate identities.<sup>98</sup> National Aniline continued to sell their food dyes under its brand name “National Colors.”

The government regulation and certification system created and helped expand a new market for the certified dye business. In 1925, the Color Laboratory’s chemist, C. E. Senseman (perfect name for his job!), reported that the production of synthetic dyes certified by the Laboratory had doubled in three years from 333,330 pounds in 1922 to 639,000 pounds in 1925.<sup>99</sup> By the mid-1920s, the number of certified dye producers increased to five companies, including H. Kohnstamm and National Aniline (the successor of Schoellkopf).<sup>100</sup> In observing the expansion of food coloring businesses, a Color Laboratory scientist stated that the kinds of food colored with synthetic dyes were so numerous that “hardly a person in this country could pass a day

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<sup>98</sup> “Allied Chemical and Dye Corporation,” *JIEC* 12, no. 11 (November 1920): 1132; “Five Companies Merged in Allied Chemical and Dye Corporation,” *Drug & Chemical Markets* 7, no. 11 (September 1920): 545; and Steen, *The American Synthetic*, 250-52.

<sup>99</sup> C. E. Senseman, “Summary of Certification of Food Colors Fiscal Year Ending June 30, 1925,” box 5, CLSF, entry 2, RG 97, NACP. See also Ambler, “Work of the Color Laboratory,” 970; and Senseman to C. A. Browne, 24 September 1925, box 5, CLSF, entry 2, RG 97, NACP.

<sup>100</sup> The five manufacturers were Warner-Jenkinson Company, Dyestuffs & Chemicals, Inc., Bates Chemical Company, H. Kohnstamm, and National Aniline. Senseman, “Report of Progress, Color Laboratory, April 1 to June 30, 1925,” box 5, CLSF, entry 2, RG 97, NACP.

without swallowing dyes unsuspectingly in such foodstuffs as butter, cheese, cake, candy, ice cream, [and] soft drinks.”<sup>101</sup> As various hues of less expensive synthetic dyes became available, with government endorsement, food producers increasingly capitalized on the color of their products by making foods look natural, fresh, and appetizing.

### **Dyes and Eyes: Color Whets the Appetite**

By the 1920s, with the expansion of the certified dye market, an emphasis on the safety and purity of synthetic dyes had become an essential part of the advertising rhetoric that dye manufacturers pitched to food processors. In the interwar years, dye makers began stressing also the powerful impact of color on food consumption – both purchasing and eating. As self-service grocery stores expanded nationally in the 1920s and 1930s, consumers relied less on store clerks’ assistance and more on their own judgment in selecting foods. Food producers and retailers believed that the appearance of food was the most important factor for consumers to judge product quality, and for grocers to attract their customers.

Dye manufacturers emphasized that their colors could give foods an appetizing look with bright, attracting hues, which would appeal to the eyes of food shoppers. In 1921, the National Aniline & Chemical Company proclaimed that “color and tints in foods” had “definite appeal to the eye and to the palate” and that “an attractive table, rich in color,” was “first aid to a healthy digestion,” in its company brochure,

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<sup>101</sup> Joseph A. Ambler, “Coal Tar Dyes We Eat and Drink,” *American Food Journal* 18, no. 2 (February 1923): 87.

distributed at the National Exhibition of Chemical Industries. Stressing the firm's leading role in the development of certified food colors permitted by the Bureau of Chemistry, National Aniline argued that synthetic dyes were indispensable for creating eye-appealing foods.<sup>102</sup> To demonstrate the "appetizing appeal" of brightly colored foods, National Aniline exhibited, along with its food dye products, a large cake decorated with layers of different color fillings at the 1921 annual convention of the National Confectioners' Association (NCA) (Fig.5).<sup>103</sup> The firm's exhibit was well received by the confectionery industry, and the colorful decoration appealed to the eyes of contemporary viewers. One confectionery trade journal reported that "no proof of this desire [for appetizing appeal] was greater than" National Aniline's cake decoration.<sup>104</sup>

As dye makers insisted on the close connections between vision and taste, food producers and retailers also underscored the eye appeal that the color of foods generated as the stimulator of consumers' desire for buying foods in the mass market. In a 1917 article in the *American Food Journal*, the secretary of the NCA argued that the sense of sight had "direct relation" to the palate: "The color attracts the eye, desire is created, and the color increases the palatability because the taste nerves are

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<sup>102</sup> National Aniline & Chemical Company, Inc., *Dyestuffs* 22, no. 9 (September 1921): 694. See also National Aniline, "*National*" *Certified Food Colors* (New York: the company, 1922).

<sup>103</sup> Ibid.; "Art in Cake Coloring," *Baking Industry* 36, no. 7 (July 1921): 57; and "Possibilities of Food Colors," *International Confectioner* 30, no. 7 (July 1921): 75.

<sup>104</sup> "Possibilities of Food Colors," 75.



Figure 5 National Aniline exhibit at the annual convention of the National Confectioners' Association in July 1921 and a color illustration of a decorated cake exhibited at the convention. Above: *International Confectioner*, July 1921; below: *Dyestuffs*, September 1921.

stimulated.”<sup>105</sup> The chemical company DuPont, touting the advantage of cellophane’s transparency, similarly asserted to the readers of *Manufacturing Confectioner*: “Your EYES can TASTE Cellophane-wrapped candy” [emphasis in the original].<sup>106</sup> Colors did not add flavor to food but helped consumers imagine its taste, as well as its smell and texture. Food producers and retailers believed that the stimulation of various senses, especially vision, led consumers to buy foods on impulse. The luscious color of foods became indispensable not simply for the sake of aesthetics, but also for whetting consumer appetite. As one grocer noted, color became “one of the greatest forces in the world” in selling foods.<sup>107</sup>

In self-service stores, brightly colored food products became an indispensable part of visually-stimulating food displays. As historian Tracey Deutsch has shown, the rise of self-service supermarkets in the first decades of the twentieth century altered consumers’ food purchasing experience, transforming the relationships between customers and store clerks.<sup>108</sup> Consumers’ sensory experience also changed

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<sup>105</sup> Walter C. Hughes, “Care of Confectionery,” *American Food Journal* 12, no. 6 (June 1917): 329. See also Stroud Jordan, “Chemistry and Confectionery,” *JIEC* 16, no. 4 (August 1924): 336-39.

<sup>106</sup> Du Pont Advertisement, *Manufacturing Confectioner* 10, no. 3 (March 1930).

<sup>107</sup> Arthur A. Poss, “Any VEGETABLE That Looks Nice,” *Meat Merchandising* 2, no. 9 (September 1926): 9.

<sup>108</sup> Tracey Deutsch, *Building a Housewife’s Paradise: Gender, Politics, and American Grocery Stores in the Twentieth Century* (Chapel Hill: University of North Carolina Press, 2010). See also James M. Mayo, *The American Grocery Store: The Business Evolution of an Architectural Space* (Westport, CT: Greenwood Press, 1993), 43-75; and Susan Strasser, *Satisfaction Guaranteed: The Making of the American Mass Market* (New York: Pantheon Books, 1989), 58-88.

dramatically. Until the first decades of the twentieth century, many grocery stores provided American consumers with limited sensory access to goods. Although consumers could see, smell, and touch some goods in a store, many products were physically out of their reach since they were displayed behind the counter or stored in a backroom. Newly established self-service stores thrust consumers into a color-saturated and sanitized environment. As visual appeal became highly important in food retailing, food color became a significant marketing tool for food manufacturers and retailers to convey standardized ideas about goodness, naturalness, and freshness of foods.

Synthetic food dyes filled various technical needs and provided economic benefits to food producers, distributors, and retailers who faced new kinds of quality control problems during the 1920s and 1930s. As the market expanded nationally, food products were transported to various parts of the country and became subject to changes in surrounding conditions, including temperature and humidity. In self-service grocery stores, food products were required to retain a relatively longer shelf-life. After transparent film, particularly cellophane, became popular in the 1920s and 1930s, the appearance of foods became an important marketing tool in selling foods. Yet transparent packages posed a problem: foods were exposed to bright light in the store. Synthetic dyes were stable and less likely to fade due to changes in temperature and strong lighting, compared to natural dyes.

The versatility of synthetic dyes enabled dye and food manufacturers to mass produce uniform products consistently and economically. The same synthetic dye was used for various processed foods. For example, synthetic dye Brilliant Blue FCF, developed by National Aniline in 1929 and later certified by the USDA, added bluish,

sometimes greenish, hues to canned peas, ice cream, cake icing, and soft drinks.<sup>109</sup>

Food producers used the green color of canned peas to help consumers visualize naturalness and freshness, while green and bluish shades of ice cream and icing indicated flavor and aesthetic variations. Since dye makers could manufacture and sell the same dye for a variety of products, there was no need to invest in additional equipment or ingredients. Food processors, too, benefited from mass-produced, inexpensive synthetic dyes as they could create various hues for different products by changing the amount of dye added to foods and by mixing several colors.

As the economic advantage of synthetic dyes became widely recognized in the food industry, agricultural producers also employed them to manipulate a physical property of their produce as though the color of fruits and vegetables was a malleable, external characteristic of the food, blurring the distinction between “processed” foods and “natural” produce. During the early 1930s, Florida citrus growers began coloring orange skins to make the fruit look ripen by soaking the fruit into synthetic color solutions. Certain varieties grown in the state ripened without a change in skin color, due to the warm climate. Growers strongly believed that oranges with green skins would not sell in the national market even if the fruit was ripe inside.<sup>110</sup> By the 1940s,

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<sup>109</sup> “New Blue Food Dye Approved,” *Food Industries* 1, no. 12 (September 1929): 570. See also National Aniline, “*National*” *Certified Food Colors: Certified to the Bureau of Chemistry, Department of Agriculture* (New York: National Aniline, 1922); and National Aniline, *Dyestuffs*.

<sup>110</sup> See Chapter 3. See also Sheldon Hochheiser, “May We Dye Our Oranges: Technological Innovation Breeds Political Controversy in the Florida Citrus Industry, 1933-1937,” in *History and Sociology of Technology: Proceedings of the Twenty-Fourth Annual Meeting of the Society for the History of Technology* (Milwaukee: Milwaukee Public Museum, 1982), 304-309; H. Harold Hume, *Citrus Fruits*, rev. ed.



the so-called “color-add” process had been widely adopted in Florida. During the 1946-47 season, 21 million out of 30 million boxes of fresh oranges shipped out of the state were colored with synthetic dyes.<sup>111</sup> Food producers used synthetic dyes also for coloring such perishable foods as fresh meat, salmon, and sweet potatoes.<sup>112</sup>

The regulation and increasing use of synthetic dyes helped to distance food production from consumers. Understanding the chemical composition of synthetic dyes required specialized knowledge. Dye names, such as Ponceau 3R and Naphthol Yellow S, meant little to most consumers. Although consumers increasingly saw such terms as “certified dyes” and “pure food” on food packages and advertisements, there was still uncertainty about food quality. In 1930, a USDA chemist published an article in the *Journal of Home Economics* to explain the safety of certified colors to the professionals of housework. The author contended that some synthetic dyes were “no more dangerous than so much common salt.” “When you see the word ‘certified’ on the label of a package of food colors, you may know that it is the government’s guarantee of purity and safety to the consumer.”<sup>113</sup> Following the USDA’s promotion,

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(New York: Macmillan, 1957); and L. P. Kirkland, “The ‘Color Added’ Situation,” *Proceedings of the Florida State Horticultural Society* 49 (1936): 103-106.

<sup>111</sup> *Problems of the Citrus-Fruit Industry*: Hearings on S. Res., Day 1, Before a Subcommittee of the Committee on Agriculture and Forestry, 80th Cong. 28 (September 1948).

<sup>112</sup> “Artificially Colored Salmon,” *American Food Journal* 13, no. 6 (June 1918): 319; “Coloring Smoked Fish,” *Grocers’ Magazine* 28, no. 12 (December 1914): 7; Herron v. Arkansas Wholesale Grocers Association, 296 S.W. 2d. 409 (1956); and Hesse, “Coal Tar Colors,” 24.

<sup>113</sup> Horace T. Herrick, “Certified Food Colors,” *Journal of Home Economics* 22, no. 11 (November 1930): 891-92.

some home economists, including Ruetta Blinks and Willetta Moore who published *Food Purchasing for the Home* in 1930, claimed to consumers that certified dyes were perfectly safe and pure.<sup>114</sup> Government standardization and certification of synthetic dyes required manufacturers to disclose certain information about food processing and dye production. However, the increasing use of synthetic dyes in a wide range of food products made it difficult for consumers to understand the relationships between color and food: Where did the color of food come from? How was food colored? Which dyes were safe to consume? What did “safe” colors mean?

While certified dye consumption continued to grow in the 1930s, the Depression-era’s political, economic, and cultural unrest heightened consumers’ concerns over food safety. As historian Charles McGovern has argued, the economic crisis “propelled consumer issues to public scrutiny.”<sup>115</sup> Journalists, consumer groups, and cultural critics condemned the government’s ineffective and inadequate food regulation policies and corporate greed, which endangered the public health. *100,000,000 Guinea Pigs*, published by economist Arthur Kallet and engineer Frederick J. Schlink in 1933, aroused consumers’ suspicion of corporate activities and various commercial goods, especially foods and medicines. Kallet and Schlink argued that the American public were “used as a guinea pig” of companies that marketed their products with little knowledge or concern about their impact on consumer health.<sup>116</sup>

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<sup>114</sup> Blinks and Moore, *Food Purchasing*, 66.

<sup>115</sup> Charles M. McGovern, *Sold American: Consumption and Citizenship, 1890-1945* (Chapel Hill: University of North Carolina Press, 2006), 223.

<sup>116</sup> Arthur Kallet and Frederick J. Schlink, *100,000,000 Guinea Pigs: Dangers in Everyday Foods, Drugs, and Cosmetics* (New York: Vanguard Press, 1933), 18.

The book went through thirteen printings in its first six months and became one of the best-selling books of the decade.<sup>117</sup>

The book also catalyzed a movement for reform in the food regulatory system under the 1906 Food and Drug Act, which some scientists and government officials had long considered inadequate. As the consumption of processed foods dramatically increased, it became clear that the 1906 act did not go far enough to protect the public health from misbranded, adulterated, and toxic products.<sup>118</sup> One of the shortcomings was the lack of authority to mandate certification of food dyes. To implement food regulation more effectively, the federal government reorganized the Bureau of Chemistry in 1927. The Bureau's research function was transferred to the newly established Bureau of Chemistry and Soils in the USDA. Another new agency, the Food, Drug, and Insecticide Administration (FDIA), took over the major regulatory responsibilities of the Bureau of Chemistry, including enforcement of food regulation and investigations of adulterated foods. In 1930, the FDIA was renamed the Food and Drug Administration (FDA). The new government body, however, did not transform the existing food regulatory policies.

After years of debate over more than a dozen proposals, Congress passed the Food, Drug, and Cosmetic Act in 1938 as an amendment to the 1906 act. The 1938 act increased government oversight of food and drugs and, for the first time, regulated cosmetics and medical devices. Under the new legislation, the use of certified colors became mandatory. The FDA also established three categories for certified dyes:

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<sup>117</sup> McGovern, *Sold American*, 245.

<sup>118</sup> FDA, "Color Additives: FDA's Regulatory Process and Historical Perspectives," reprint from *Food Safety Magazine* (October/November 2003).

FD&C as colors certified for use in foods, drugs, and cosmetics; D&C as certified colors for drugs and cosmetics; and Ext. D&C as colors not certifiable for use in products intended for ingestion, but considered safe for use in products externally applied. Each certified food dye was called FD&C, followed by the name of basic shade, such as green and red, and a number. For instance, trade name “Guinea Green B” became “FD&C Green #1”; while “Light Green SF Yellowish” was called “FD&C Green #2.”<sup>119</sup> The standardization of dye nomenclature provided administrators, scientists, and dye makers with common vocabularies to specify food dyes, allowing them to communicate more efficiently. The new names also enabled dye users to distinguish certified colors from uncertified products much more easily since trade names, such as “Guinea Green B,” did not indicate whether it was a certified color.

While the 1938 act amended some of the flaws in the 1906 Pure Food Law, the new regulation did not fully provide solutions to the ambiguous interpretation of “harmlessness” and “safety.” In amending the 1906 act, the FDA did not reassess the safety of the certified food dyes and continued to certify the same fifteen colors under the same standards and procedures the Bureau of Chemistry had been using. Under the statute, a dye could be used if it was “harmless and suitable for use in foods” and a food was deemed adulterated if the dye used was *not harmless*. The FDA interpreted the term “harmless,” as well as “not harmless,” based on the quantity of substances that people consumed. If the quantity of dyes involved in human consumption was so small that it did not render food injurious to health, the substance was deemed

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<sup>119</sup> Hochheiser, “Synthetic Food,” 102-103. See also Committee on Food Protection, National Research Council, *Food Colors* (Washington, D.C.: National Academy of Science, 1971).

“harmless” even if there was evidence that it had a poisonous effect on animals.<sup>120</sup> It was not until the late 1950s that the FDA began to reconsider its interpretation of “harmless.” In 1960, the amendment to the 1938 act eliminated the term “harmless” from the statute and redefined certified food color additives as colors “suitable and safe” for food use.

### **Conclusion**

Government officials and scientists served to endorse food coloring as an important food manufacturing process by establishing certified “safe” colors as a category and by regulating, as well as permitting, the coloring of foods. While neither federal nor state governments explicitly encouraged the artificial coloration of foods, they recognized food dyes as legitimate ingredients as long as dyes were not poisonous and coloring did not conceal inferiority. The definition of safe colors reflected government officials’ and consumers’ shifting concerns over food adulteration and dye companies’ marketing strategies for selling their products.

The dye certification system helped accelerate the commodification of food colors. Dye manufacturers and food producers assessed the market value of food colors based on their purity, intensity, and uniformity. The certification offered dye makers an endorsement that their dyes were “safe” for food consumption while they utilized the term “certified” to add credibility to their products and to ensure and

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<sup>120</sup> *Certified Color Industry Committee v. Secretary of Health, Education and Welfare*, 236 F.2d 866 (2nd Cir. 1956). See also *Flemming v. Florida Citrus Exchange*, 358 U.S. 153 (1958).

increase their commercial value. Trademarked dye products, such as H. Kohnstamm's "Atlas Color" and National Aniline's "National Color," also suggest the increasing commercialization of food colors, the brands serving as a marker of product quality in the mass market. The use of synthetic dyes in unprecedented volume for variety of foods facilitated the close connections between the dye and food industries while transforming what and how consumers saw in food stores and on the dining table.

## Chapter 2

### THE COLOR OF NEW TASTES: HOW FOOD SHOULD LOOK

Beginning in the late nineteenth century, American consumers encountered not only uniformly looking food products brightly colored with synthetic dyes, such as candies and butter, for the first time, but also agricultural produce shipped from distant production sites and newly invented processed foods, including oranges, bananas, pineapples, cabbages, canned foods, and margarine.<sup>1</sup> As new food products arrived in the American market, legislators, food producers, traders, and advertising agents played a critical role in teaching consumers the “proper” colors of foods that many Americans had never seen or eaten, while promoting their consumption. This chapter explores the complex and contested processes of creating ideas about how food should look mainly at the turn of the twentieth century. I analyze how various actors shaped, defined, and sometimes challenged ideas about the “right” color of foods.

Until the last decades of the nineteenth century, most Americans had relied on food products supplied by local farmers, as well as on produce they grew themselves. Fresh produce was available only during the growing season. Although upper-class Americans could afford to purchase imported fruits and vegetables, their choices were

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<sup>1</sup> See Harvey Levenstein, *Revolution at the Table: The Transformation of the American Diet* (Berkeley: University of California Press, 2003); Gary Okimoto, *Pineapple Culture: A History of the Tropical and Temperate Zones* (Berkeley: University of California Press, 2009); and Waverley Root and Richard de Rochemont, *Eating in America: A History* (New York: William Morrow, 1976).

limited due to inadequate transport systems. By the 1850s agricultural products from Florida and California had begun to reach Northeastern markets. These foods, however, were often damaged and rotten by the time they arrived at the auction sites near the markets.<sup>2</sup> Starting around 1870, refrigerated railcars and long-distance transportation systems enabled the shipment of perishable produce.

The distribution and consumption of various food products expanded not only regionally but also across class lines. Until the turn of the twentieth century, some of the most popular foods in the United States today – such as bananas and oranges – were luxury items, consumed primarily by middle- and upper-class consumers in urban markets. Similarly, although commercial canners had existed since the early nineteenth century in the United States, it was not until the last few decades of the century that manufacturers, particularly Del Monte, Libby's, Heinz, and Campbell's, began large national businesses. In the 1870s, the development of canning technology, such as the application of steam pressure, enabled canners to mass produce various canned foods. By the turn of the twentieth century, canned foods had become widely available for many Americans, including working-class consumers.<sup>3</sup> Fresh agricultural produce was still scarce, especially during winter, but canned goods provided lower-

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<sup>2</sup> Levenstein, *Revolution at the Table*, 30; Root and Rochemont, *Eating in America*, 129-33, 150-55; and Susan Strasser, *Never Done: A History of American Housework* (New York: Pantheon Books, 1982), 11-12, 16-17.

<sup>3</sup> H. A. Baker, "The Canning Industry – Some Accomplishments and Opportunities along Technical Lines," *Journal of Industrial and Engineering Chemistry* 10, no. 1 (January 1918): 69; and James H. Collins, "How America Made Canning Its Own," *Canning Age* 3, no. 7 (July 1922): 35. See also Levenstein, *Revolution at the Table*, 30, 34-37; Root and Rochemont, *Eating in America*, 158-59; and Katherine Leonard Turner, *How the Other Half Ate: A History of Working-Class Meals at the Turn of the Century* (Berkeley: University of California Press, 2014), 4-6, 29, 34-35.



as well as upper-class consumers with colorful arrays of pineapples, peaches, corn, peas, and tomatoes. Although the appearance and taste of canned foods were not identical to fresh produce, canning technology transformed American eating habits by increasing the availability of out-of-season fruits and vegetables, once a luxury for most American consumers.

As an increasing number and variety of foods became available, food producers, advertisers, legislators, and consumers created the color of foods at the nexus of cultural expectations, business interests, regulation, and environmental conditions. This chapter begins with the construction of cultural expectations by analyzing the color of bananas and oranges newly introduced to the wider American population during the late nineteenth century. To maximize profits and successfully compete against counterparts, fruit growers and traders promoted specific varieties and shades of these products, which many Americans eventually considered their “natural” colors. The availability of foods on the market, corporate marketing, and professional advice on food consumption helped shape and reinforce the popular conception about how food should look. Federal and state governments also served to define and endorse the “right” color of foods by regulating certain products and establishing grade standards.

While food advertisers and domestic advisers helped shape cultural expectations about the color of certain foods, consumers’ preconceived notions about food color in turn exerted a powerful impact on producers’ marketing strategies and government regulatory policies. The second section turns to the influence of cultural expectations on food regulation, production, and marketing by focusing on the controversy over the color of margarine. The debate provides an insight into the

dynamic relationships among cultural expectations, corporate interests, and government regulation.

The chapter concludes with an examination of color printing, which served to represent, reiterate, and reinforce expectations about food color. During the 1920s and 1930s, the increasing use of color printing in food advertisements, cookbooks, and popular magazines not only caught consumers' attention but also provided them with visual references showing how food should look. As colorful food advertisements increasingly appeared in national magazines, a growing number of consumers across the country saw the same image wherever they lived, creating a kind of "imagined community," to use Benedict Anderson's famous term.<sup>4</sup> Women in New York City, San Francisco, and Chicago saw the same colorful advertisements of Sunkist oranges and Swift's Premium ham, featured in the *Ladies' Home Journal*, *Good Housekeeping*, and other mass-circulated magazines. Nationally distributed color printing helped teach consumers the idealized and standardized image of the "right," "natural" color of various food products.

### **Creating Color Expectations**

By the 1910s, bananas had become one of the most popular foods in the United States, recognizable by their yellow color and curved shape. Until the 1890s, however, yellow was not the fruit's only "natural" color to appear in the American market. When the import of bananas began early in the nineteenth century, a primary variety

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<sup>4</sup> Benedict Anderson, *Imagined Community: Reflections on the Origin and Spread of Nationalism*, rev. ed. (New York: Verso, 1991).

traded was the Cuban Red, which had red-purplish skin and was smaller and plumper than the yellow variety that later became more common.<sup>5</sup> As banana imports increased throughout the nineteenth century, at least two varieties reached the United States market from Central and South America, mainly Cuba and Panama: the Dacca banana with red-purplish skin; and the Gros Michel variety with yellow skin.<sup>6</sup> In the mid-nineteenth century, both red and yellow bananas were a luxury for most American consumers, selling for ten to twenty-five cents for each individual banana; in comparison, beef sirloin was about ten cents per pound.<sup>7</sup>

Both red and yellow bananas appeared in various media, intended primarily for middle- and upper-class consumers, during the 1870s and 1880s. An 1871 Currier & Ives lithograph, *Fruits of the Tropics*, included both varieties, along with other fruits (Fig.6).<sup>8</sup> *Mrs. Lincoln's Boston Cook Book*, published in 1884, introduced a recipe for "Tropical Snow," which called for six "red bananas," as well as other "tropical" foods,

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<sup>5</sup> The first recorded bananas to reach New York arrived in 1804. Roy Kerr, "The Lowly, but also the Mighty Banana – A Noble Product," a speech given before the New Orleans Cosmopolitan International Club, May 3, 1962, folder 4, box 8, Henry B. Arthur Papers, HBS Archives, Baker Library Historical Collections, Harvard Business School, Cambridge, MA. See also John Soluri, *Banana Cultures: Agriculture, Consumption, and Environmental Change in Honduras and the United States* (Austin: University of Texas Press, 2005), 36.

<sup>6</sup> Peter Chapman, *Bananas: How the United Fruit Company Shaped the World* (New York: Canongate, 2007), 19; Dan Koeppel, *Banana: The Fate of the Fruit That Changed the World* (New York: Hudson Street Press, 2008), xii; and Soluri, *Banana Cultures*, 36-37.

<sup>7</sup> Kerr, "The Lowly"; and A. L. Webster, *The Improved Housewife, or Book of Receipts, with Engravings and Marketing and Carving*, rev. ed. (Boston: Phillips, Sampson, 1855), 13.

<sup>8</sup> I thank Shana Klein for bringing this source to my attention.



Figure 6 *Fruits of the Tropics*. New York: Currier & Ives, c.1871. Prints and Photographs Collection, Library of Congress.

such as oranges and coconut. The dessert was layers of orange and banana slices, sprinkled thickly with coconut and powdered sugar on the top.<sup>9</sup> An 1889 advertisement noted that there were two kinds of bananas, the yellow and the red, and that the “latter [was] considered the best.”<sup>10</sup>

After the 1890s, as the importation of bananas increased and their retail price declined, the fruit became a popular food item. A 1904 article published in the *Scientific American* even called bananas the “poor man’s fruit.”<sup>11</sup> During the first

<sup>9</sup> Mary Johnson Bailey Lincoln, *Mrs. Lincoln’s Boston Cook Book: What to Do and What Not to Do in Cooking* (Boston: Roberts Brothers, 1884), 393.

<sup>10</sup> Quoted in Soluri, *Banana Cultures*, 39.

<sup>11</sup> Mel T. Cook, “The Banana,” supplement, *Scientific American*, September 23, 1905, 24847. See also “Banana – Their Culture and Transportation,” *Scientific American*, January 28, 1905, 78, 80; and “Fruits as Foods and Fruits as Poisons,” *Ladies Home Journal (LHJ)*, June 1898, 25.

decades of the twentieth century, the quantity of bananas imported to the United States increased rapidly: in 1910 over 40 million bunches arrived at United States ports, increasing to nearly 50 million in the next four years.<sup>12</sup> Per capita banana consumption rose from 18.1 pounds in 1915 to 23.4 pounds in 1928.<sup>13</sup> The fruit became a common ingredient in various recipes, mainly desserts such as pudding, ice cream, and pies.<sup>14</sup> By the 1920s, bananas had become a part of American popular culture, often referred to in songs, poems, and novels.<sup>15</sup>

When bananas began to reach a wider population, due to better transportation and corporate interests in making better profits, yellow became the color that American consumers expected as the indication of good, mature bananas. Because the Gros Michel had thicker skin, it was more suitable for shipping to distant markets than red varieties.<sup>16</sup> As the import of yellow bananas increased, their images pervaded

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<sup>12</sup> Soluri, *Banana Cultures*, 62. See also “The Banana,” *Scientific American*, March 21, 1896, 186.

<sup>13</sup> Harvard University Graduate School of Business Administration, Exhibits Presented for the Harvard Advertising Awards, vol.8, pt.1, “Report and Recommendations on Filed Survey for the Fruit Dispatch Company,” May 13, 1940, Ms. Div. SPGD H339a, Baker Library Historical Collections.

<sup>14</sup> See, for instance, Fannie Merritt Farmer, *The Boston Cooking-School Cookbook* (Boston: Little, Brown, 1896); Janet M. Hill, “Seasonable Recipes,” *Boston Cooking School Magazine of Culinary Science and Domestic Economics (BCS)*, June 1913, 38-39; Sarah Tyson Rorer, *Mrs. Rorer’s New Cook Book: A Manual of Housekeeping* (Philadelphia: Arnold, 1902); and Sarah Field Splint, *The Art of Cooking and Serving* (Cincinnati, OH: Procter and Gamble, 1929).

<sup>15</sup> Soluri, *Banana Cultures*, 57-62. See also Virginia Scott Jenkins, *Bananas: An American History* (Washington, D.C.: Smithsonian Books, 2000).

<sup>16</sup> Chapman, *Bananas*, 19; Koeppel, *Banana*, xii, xiv; and Soluri, *Banana Cultures*, 39.

advertisements and cookbooks. The United Fruit Company and other fruit shipping firms promoted the consumption of yellow bananas (Fig.7). Even brochures which were not published by banana traders showed consumers the fruit only with yellow skins (Fig8). Although the red variety continued to appear on the market sporadically, it was more expensive: the wholesale price of yellow bananas was about \$1.50 to \$2 per bunch, whereas red bananas usually cost \$2 to \$3.<sup>17</sup>



Figure 7 United Fruit Company, “A Short History of Bananas and a Few Recipes for Its Use,” 1904. Warshaw Collection, National Museum of American History, Smithsonian Institution.

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<sup>17</sup> Hannaford Bros. Company, Price List, “Fruits and Produce,” 1903-1904, box 8, “Food,” Warshaw Collection of Business Americana, circa 1724-1977, Archives Center, National Museum of American History (NMAH), Washington D.C.

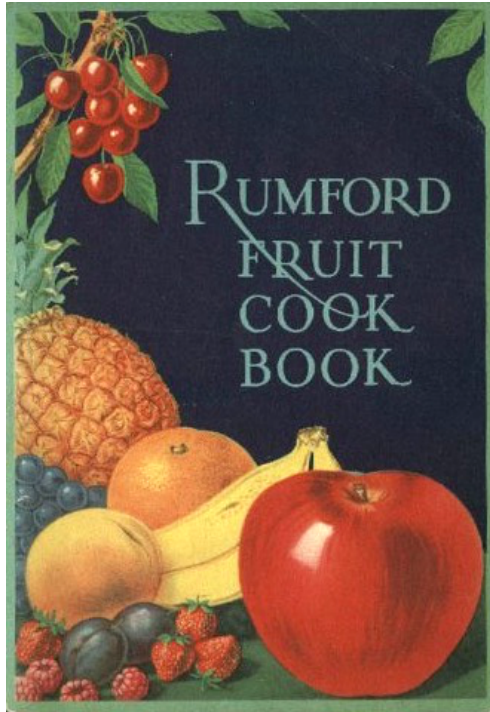


Figure 8 “Rumford Fruit Cook Book,” 1927. Product Cookbooks Collection. National Museum of American History, Smithsonian Institution.

Around the same time, another now-popular fruit – oranges – also became an everyday food. Like bananas, citrus consumption was once limited to relatively wealthy people in urban markets.<sup>18</sup> For many American consumers, citrus was a luxury, eaten for special occasions such as Thanksgiving and Christmas. Children

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<sup>18</sup> Arno Johnson, “Client Talk for the Florida Citrus Commission,” 1955, box 18, J. Walter Thompson Company (JWT), Writings and Speeches, David M. Rubenstein Rare Book & Manuscript Library, Duke University, Durham, NC; and Agricultural Adjustment Administration (AAA), U.S. Department of Agriculture (USDA), *Recent Changes in the Florida Citrus Industry: A Graphic Review of Certain Economic Factors Bearing on the Production and Marketing of Florida Oranges and Grapefruits* (Washington, D.C.: USDA, 1938).

often found a bright-orange fruit in their Christmas stockings as a present.<sup>19</sup> As one of the few fruits available for northeastern consumers during winter, the orange's bright color symbolized an exotic, temperate place.<sup>20</sup>

The development of the transcontinental railways and refrigerated cars enabled fruit shippers to transport highly perishable fruits to distant markets in the late nineteenth century, expanding the market geographically. The citrus industry's extensive marketing campaigns also contributed to encouraging the nation-wide consumption of oranges, often by promoting the bright orange color as the sign of freshness.<sup>21</sup> In 1907, with the Southern Pacific Railroad's financial support, the California Fruit Growers Exchange (CFGE), the largest citrus cooperative in the state and the predecessor of Sunkist Growers, Inc., launched its first major advertising campaign for oranges, using Iowa as a test market.<sup>22</sup> After the campaign, Iowa orange sales increased by 50 percent compared with a nationwide increase of 20 percent.<sup>23</sup>

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<sup>19</sup> Florida State Department of Agriculture (FSDA), *Citrus Industry of Florida* (Tallahassee, FL: Department of Agriculture, 1955), 16; Institute for Motivational Research, Inc., "A Motivational Research Study of the Sales and Advertising Problems of Citrus Fruit," July 1955, box 22, Ernest Dichter Papers (Accession 2407), Hagley Museum and Library, Wilmington, DE; and Isabelle Thursday, "Developing the Home Market for Florida Citrus Fruits," *Proceedings of Florida State Horticultural Society (FSHS)* 49 (1936): 49.

<sup>20</sup> FSDA, *Citrus Industry of Florida*, 16; and "Major Trends in Consumption of Fruits and Vegetables," *Food Industries* 2, no. 8 (August 1930): 364-66.

<sup>21</sup> The first car load of oranges was shipped from California to outside the state in the late 1870s. Josephine Kingsbury Jacobs, "Sunkist Advertising" (PhD diss., University of California, Los Angeles, 1966): 3.

<sup>22</sup> In August 1893, individual growers, led by P. J. Dreher and his son, Edward L. Dreher, founded the CFGE's forerunner, the Southern California Fruit Exchange (SCFE) in Claremont, California. In 1905, the SCFE renamed itself the California



Until then, neither producers nor advertising agents thought that they could successfully advertise an orange or any farm produce, believing that an orange was “just an orange” without anything new or worth mentioning in an advertisement. Nor did they consider it possible to trademark an agricultural product.<sup>24</sup> In 1908, the CFGE’s advertising agency came up with a trade name, Sunkist, for oranges marketed through the CFGE and printed the name on advertisements and brochures. In 1926, the CFGE began stamping fresh oranges with the Sunkist trademark on their skin.<sup>25</sup> As historian John Soluri has argued in his analysis of “Chiquita” bananas, by turning an agricultural commodity into a retail product distinguishable by a brand name, the CFGE, as well as other fruit shipping companies and cooperatives, promoted fruits from particular regions and companies and sought to identify their names with high quality products.<sup>26</sup>

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Fruit Growers Exchange. C. H. Kirkman, *The Sunkist Adventure* (Washington D.C.: USDA, Farmer Cooperative Service, 1994); and “History,” Sunkist, 2016, accessed January 25, 2016, [https://www.sunkist.com/about-us/?doing\\_wp\\_cron=1453943515.0414969921112060546875#cooperative-history](https://www.sunkist.com/about-us/?doing_wp_cron=1453943515.0414969921112060546875#cooperative-history).

<sup>23</sup> Don Francisco, “The Story of Sunkist Advertising,” December 9, 1948, JWT, Writings and Speeches, Rubenstein Library; and Douglas Cazaux Sackman, “‘By Their Fruits Ye Shall Know Them’: ‘Nature Cross Culture Hybridization’ and the California Citrus Industry, 1893-1939,” *Citriculture and Southern California, California History* 74, no. 1 (Spring 1995): 91. See also Don Francisco, “The Plans Behind the 1920 Sunkist Advertising,” *Advertising and Selling* 30, no. 1 (June 26, 1920): 20; and Kirkman, *The Sunkist Adventure*, 12-13.

<sup>24</sup> Francisco, “The Story of Sunkist Advertising.”

<sup>25</sup> In 1952, the CFGE changed its name to Sunkist Growers, Inc.

<sup>26</sup> Soluri, *Banana Cultures*, 184. See also Sackman, “By Their Fruits.”

The color of oranges served as an important sign of quality and brand identification. Beginning in the first decade of the twentieth century, the CFGE presented citrus fruits in bright yellow and orange colors in advertisements, postcards, cookbooks, and other promotion materials (Fig.9). In its marketing campaigns, the CFGE sought to characterize oranges as a dietary staple and promoted them as an important part of breakfast and school lunches, desirable for the proper development of physical health in both children and adults.<sup>27</sup> The citrus industry was one of the first food industries to use Vitamin C as a sales pitch in food advertising. Advertisements

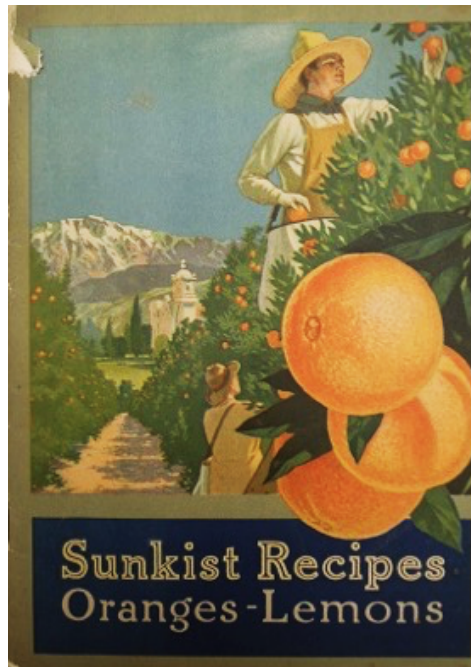


Figure 9      “Sunkist Recipes Oranges-Lemons,” 1916. Product Cookbooks Collection, National Museum of American History, Smithsonian Institution.

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<sup>27</sup> FSDA, *Citrus Industry of Florida*, 16.

in popular magazines, newspapers, and radio programs taught consumers that citrus fruits were a great source of Vitamin C when “vitamin” was just becoming a household term in the United States.<sup>28</sup> “Whole days are better” was a phrase the CFGE often used in its early-twentieth-century advertisements, indicating that eating at least one orange every day would make people, especially “workers,” vigorous and healthy for the entire day.<sup>29</sup> As historian Harvey Levenstein has noted, these advertisements as well as promotion from nutritionists and home economists helped create “a national vogue” for citrus fruits.<sup>30</sup> As colorful illustrations and sales messages promoted oranges as a popular everyday food, their bright orange color became an indication not only of the fruit’s ripeness but also of freshness and healthfulness.

Window displays provided urban residents with a colorful image of oranges while promoting the purchase of citrus fruits (Fig. 10). In the early twentieth century, grocery trade journals such as *the Progressive Grocer*, and manuals for the grocery business, emphasized the importance of window displays to catch the consumer’s eyes and to promote sales of all kinds of products.<sup>31</sup> Advertising agencies and store owners believed that a heap of bright oranges would offer the public an attractive color and

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<sup>28</sup> “Food News of the Week,” *New York Times (NYT)*, December 30, 1938; and “Vitamin A Is Found to Attack Disease,” *NYT*, September 8, 1936. For the increasing popularity of vitamin in the United States, see Rima D. Apple, *Vitamanía: Vitamins in American Culture* (Newark, NJ: Rutgers University Press, 1996).

<sup>29</sup> Sunkist Advertisement, *NYT*, May 15, 1923.

<sup>30</sup> Levenstein, *Revolution at the Table*, 154. See also Sackman, “By Their Fruits,” 92.

<sup>31</sup> See, for instance, Alfred G. Bauer, *The Art of Window Dressing for Grocers* (Chicago: Sprague, Warner, 1902); William L. Butler, *How to Make Grocery Windows Pay* (New York: Progressive Grocer: 1932); “Color and Light as Expert Salesmen,” *Printers’ Ink Monthly* 8, no. 4 (April 1924): 92; “New Tricks in Old



Figure 10 Window display in California, 1920. Prints and Photographs Collection, Library of Congress.

the impression that “oranges were abundant and hence probably low in price.”<sup>32</sup> In his analysis of department stores and show windows of the mid-twentieth century, French theorist Jean Baudrillard has described the abundant display of foods and other goods as the “primal landscape,” which presented an “alimentary and vestimentary feast”

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Windows,” *Progressive Grocer* 14, no. 3 (March 1935): 30-31; and “What Colors Best Catch the ‘Window Shoppers’?” *Printers’ Ink Monthly* 11, no. 6 (December 1925): 67. See also Earl W. Brown, “The Value of Exhibits in Advertising Florida and Its Fruits,” *FSHS* 49 (1936): 81; and Douglas Cazaux Sackman, *Orange Empire: California and the Fruits of Eden* (Berkeley: University of California Press, 2007), 98-99.

<sup>32</sup> Francisco, “The Story of Sunkist Advertising.” See also Brown, “The Value of Exhibits,” 81; and Thomas Patrick Jacobsen, *Pat Jacobsen’s Collector’s Guide to Fruit Crate Labels* (Pleasant Hill, CA: Patco Enterprises, 1994), 24.

and “stimulate[d] magical salivation.”<sup>33</sup> Although the scale of window displays of early-twentieth-century grocery stores was much smaller than that of department store showcases, bright oranges displayed in windows similarly served as a sign of “a new-found nature of prodigious fecundity,” providing urban consumers with a visual image of nature as a cornucopia of perfect crops as well as promoting and naturalizing the idea that oranges were a bright orange fruit – which they sometimes were not.<sup>34</sup>

Market buyers usually paid forty to fifty cents per box more for better-colored oranges than for fruits with green tinges or light orange shades.<sup>35</sup> Fruit shippers and traders believed that consumers would pay more for brighter fruits. For instance, on November 23, 1909, the price of “well colored” Florida oranges was \$2 per box in the New York market while “green and poor” fruit was sold at \$1.25 per box.<sup>36</sup> Higher prices not only reflected the popular perception of acceptable color but also helped educate consumers that brighter oranges were “better” quality.

Grading systems, established by federal and state governments, standardized not only the color of foods traded on the market but also what producers, merchants, and consumers expected to be the “natural” and “good” color of foods by categorizing fruits and vegetables into grades such as “fancy,” “choice,” and “U.S. No.1.” Grade

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<sup>33</sup> Jean Baudrillard, *Consumer Society: Myths and Structures*, trans. Chris Turner (1970; repr., Thousand Oaks, CA: SAGE, 1998), 26.

<sup>34</sup> Ibid.

<sup>35</sup> L. P. Kirkland, “The ‘Color Added’ Situation,” *FSHS* 49 (1936): 105.

<sup>36</sup> “Market Reports,” *Ocala Evening Star*, November 23, 1909. See also Sidney Hoos and J. N. Boles, “Orange Industry Trends,” *California Agriculture* 7, no. 3 (March 1953): 31; and “Sales of Citrus Fruit in New York Market,” *Chicago Packer*, December 14, 1935.

standards for fruits and vegetables provided “objective” definitions of how agricultural products should look. Along with size and shape, color was an important criterion, used for grading almost all produce. Since the late nineteenth century, agricultural cooperative leaders had advocated the importance of grading fruits and vegetables to supply uniform and high quality produce.<sup>37</sup> But it was not until the 1910s that federal and state governments began establishing grade standards. One of the earliest standards was Maine’s quality standard for apples, issued in 1910. By 1917, most of the fruit-producing states had enacted grade standard laws that specified the color, size, and shape of foods, which could be marketed under certain grades.<sup>38</sup> For instance, under California’s 1917 Fresh Fruit, Nut, and Vegetable Standardization Act, oranges needed to attain at least 25 percent yellow or orange color before picking.<sup>39</sup> The USDA established the first federal standard in 1917 for grading potatoes, followed by other fruits and vegetables.<sup>40</sup> These government grade standards helped

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<sup>37</sup> B. F. Walton, “Grading and Packing Fruit to Meet the Wants of the Trade,” *Pacific Rural Press*, June 8, 1895. See also Gordon Mackinney and Angela C. Little, *Color of Foods* (Westport, CT: Avi, 1962), 232-37.

<sup>38</sup> Steven Stoll, *The Fruits of Natural Advantage: Making the Industrial Countryside in California* (Berkeley: University of California Press, 1998), 90. See also W. S. Killingsworth, “Standardization Promotes Fruit Industry,” *Pacific Rural Press*, February 1920.

<sup>39</sup> James H. Deering, *Supplement to the Codes and General Laws of the State of California of 1915, Showing the Changes Affecting the Codes and the General Laws for the Years 1917 and 1919* (San Francisco: Bancroft-Whitney, 1919), 1078.

<sup>40</sup> Following potato standards, the federal government established standards for other vegetables, fruits, and nuts in 1917; butter, cheddar cheese, nonfat dry milk, and certain other dairy products in 1919; rice, dry beans, peas and related products in 1924; eggs in 1925; poultry in 1930; beef, veal and calf, and lamb and mutton carcasses in 1926; and canned, frozen, and dried fruits and vegetables, and other related products such as preserves in 1928. H. E. Erdman, *American Produce Markets*

aid the marketing of farm products by providing a common language for wholesale trading and a means of establishing prices.

By the 1930s, the orange had become one of the “most common foods” in the United States.<sup>41</sup> Due to the expansion of the citrus market, competition between orange growing regions, particularly California and Florida, became intensified. Throughout the late nineteenth and early twentieth centuries, Florida and California had been the two major orange-producing states, providing more than 80 percent of the oranges in the nation. During the 1920s and 1930s, Florida’s share of national citrus production accounted for about 38 percent while California held 54 percent market share.<sup>42</sup> Florida’s marketing channel was relatively limited to the northeastern region due to the geographical proximity: in the mid-1930s, more than 50 percent of

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(Boston: D. C. Heath, 1928), 255; Stoll, *The Fruits of Natural Advantage*, 90; and Bureau of Agricultural Economics, USDA, “Handbook of United States Standards for Grading and Marketing Fresh Fruits and Vegetables,” Miscellaneous Publication No. 190 (June 1934): 3-4.

<sup>41</sup> Raymond E. Crist, “The Citrus Industry in Florida,” *American Journal of Economics and Sociology* 15, no. 1 (October 1955): 6-7. From the 1919-1920 through the 1924-1925 season, national production of oranges averaged 30.2 million boxes a season and rose to 53.4 million boxes a season in the period from 1931-1932 through 1936-1937. While per capita consumption of fresh fruits in the United States changed very little between 1918 and 1948, the consumption of citrus fruits more than doubled. AAA, *Recent Changes*; Sidney Hoos and J. N. Boles, “Oranges and Orange Product,” University of California, College of Agriculture, California Agricultural Experiment Station Bulletin no. 731 (1953): 5, 11-13; and Paul E. Shuler and J. C. Townsend, Jr., “Florida Citrus Fruit Annual Summary 1957,” Agricultural Marketing Survey, USDA.

<sup>42</sup> AAA, *Recent Changes*, 5-7; and Elizabeth Hoffman and Gary D. Libecap, “Political Bargaining and Cartelization in the New Deal: Orange Marketing Orders,” in *The Regulated Economy: A Historical Approach to Political Economy*, eds. Claudia Goldin and Gary D. Libecap (Chicago: University of Chicago Press, 1994), 194.

Florida oranges were sold in New York, Pennsylvania, and Massachusetts.<sup>43</sup> In the region, 53 percent of oranges were shipped from Florida while California oranges constituted 46 percent.<sup>44</sup> Florida packers did not find the Western and Pacific markets profitable mainly because of the higher freight rate.<sup>45</sup> In some major urban markets in the Midwest, including Chicago, Detroit, and Cleveland, transportation charges from Florida were less than the cost from California primarily due to the shorter geographical distance. Despite the freight rate advantage, Florida oranges accounted for about 30 percent in these cities and nearly 70 percent were from California.<sup>46</sup>

Florida growers and packers believed that the color of oranges was the major obstacle in expanding their market. California oranges generally assumed more uniform and brighter color than Florida fruits due to different climate conditions. Florida growers asserted that consumers in the Midwest and West were accustomed to bright California oranges and it was imperative to supply better colored fruits to successfully compete against California fruits in these regions. In 1926, after traveling back from California, a Florida citrus grower told a local newspaper reporter that Florida growers must “devote greater attention to the production of bright and fancy

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<sup>43</sup> AAA, *Recent Changes*, 38.

<sup>44</sup> AAA, *Recent Changes*, 36; and William S. Hoofnagle, *Changes in the Marketing Pattern of Florida Fresh Oranges between Prewar and Postwar Periods* (Washington, D.C.: U.S. Bureau of Agricultural Economics, 1952), 19.

<sup>45</sup> Hoofnagle, *Changes in the Marketing Pattern*, 19.

<sup>46</sup> The shipping cost to Chicago in 1938, for instance, was \$0.85 per box from Florida and \$1.11 from California. AAA, *Recent Changes*, 36, 40; and Hoofnagle, *Changes in the Marketing Pattern*, 15-19.



fruit” because California oranges assumed a “much better appearance.”<sup>47</sup> He argued that while Florida oranges tasted better, they were sold at a greatly reduced price compared with California oranges because of their color.<sup>48</sup> Many Florida growers shared his view, insisting that their oranges could not be “made presentable alongside of the highly colored California fruit,” hence producing fruits of poor appearance was “absolutely unprofitable to growers.”<sup>49</sup>

Florida growers and packers generally admitted that campaigns by the California Fruit Growers Exchange (CFGE) were “an upbuilder for the entire citrus industry.”<sup>50</sup> An editor of the citrus trade journal *Florida Grower Magazine* declared that “much of the present demand for this fruit [was] developed by [the CFGE’s] advertising.”<sup>51</sup> However, Florida citrus producers complained that the CFGE emphasized primarily the appearance of oranges in promoting California fruits and “educated the American public to buy oranges solely judging by the appearance of the

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<sup>47</sup> “Fay Back from California, Says Florida Must Produce Brighter Fruit,” *Citrus Industry* 7, no. 4 (April 1926): 28.

<sup>48</sup> *Ibid.*

<sup>49</sup> “Bright Fruit from the Marketing Viewpoint,” *Citrus Industry* 6, no. 4 (April 1925): 6. See also *Problems of the Citrus-Fruit Industry* [hereafter “1948 Hearings”]: Hearings on S. Res., Day 2, Before a Subcommittee of the Committee on Agriculture and Forestry, 80th Cong. 105 (September 1948) (statement of John A. Snivley, Sr., Snively Groves, Inc., Winter Haven, FL); and Day 3, 247 (statement of Howard Philips, Executive Vice President, Dr. P. Philips’ Cooperative, Orland, FL).

<sup>50</sup> “Calif. Exchange Opens Battle on Florida Oranges,” *Chicago Packer*, December 12, 1936.

<sup>51</sup> Marvin H. Walker, “Advertising and Publicizing the Citrus Fruits of Florida,” *FSHS* 49 (1936): 70.

skin, regardless of palatability, vitamin and juice content, healthfulness, etc.”<sup>52</sup> This was not entirely true because the CFGE did promote the health benefit of oranges, and appearance was not the sole focus of their promotion. Yet Florida growers’ and packers’ complaints indicated their sense of rivalry against California fruits and their great concern about the bright color of oranges.

Against California citrus, Florida advertisements deemphasized the appearance of oranges, or emphasized that color was not the indication of fruit quality. In a 1936 advertisement, printed in the *New York Times Magazine*, the Florida Citrus Commission (FCC), a board of director for the Florida State Department of Citrus, introduced a new criterion from a home economist: “Buy Grapefruit and Oranges not by looks ... but by FEEL.”<sup>53</sup> Showing a photograph of a woman holding an orange on each hand, the advertisement noted that because Florida oranges contained “a fourth more juice” than fruits from other places, they weighed more. Thus, to purchase “juicy” and “tree fresh” fruit, consumers should use their hands, not their eyes, the ad suggested.<sup>54</sup> Moreover, in emphasizing the geographical origin of the fruit, the Florida

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<sup>52</sup> Brown, “The Value of Exhibits,” 80. See also “Florida Defends Its Fruits,” *NYT*, December 6, 1936.

<sup>53</sup> The FCC was founded in 1935 and served to centralize the marketing of Florida citrus by conducting market research and carrying out orange promotion campaigns in national media. The FCC’s promotion cost was paid by citrus growers in the form of State Excise Taxes on their crops, amounting to one cent a box on oranges, three cents a box on grapefruit, and five cents a box on tangerines. “Florida Citrus Fruit Advertising Campaign Soon,” *Chicago Packer*, November 9, 1935; C. E. Stewart, “The Florida Citrus Commission and Its Work,” *FSHS* 49 (1936): 62; and Walker, “Advertising and Publicizing,” 69. See also “Florida Citrus Commission Gives Trade Luncheon,” *Chicago Packer*, October 30, 1937.

<sup>54</sup> Florida Citrus Advertisement, *NYT Magazine*, March 15, 1936. A series of citrus advertisements by the FCC stressed the name “Florida.”

citrus industry tried to create “Floridas” as a brand name and its image as juicy and fresh fruit. Many growers contended that a statement that Florida citrus contained more juice was the “best selling argument” that the Florida citrus industry could make against California fruits.<sup>55</sup>

As Florida growers insisted, the appearance of oranges did not always correlate with eating quality. Depending on climate conditions, the skin color of certain varieties, including Florida Satsuma and California Valencia, sometimes stayed green even when the inside of the fruit was ripe. Both the Florida and California citrus industries tried to publicize that the green color was “only skin deep” and that color had nothing to do with the inside quality.<sup>56</sup> A 1934 consumer buying guide taught consumers that Valencia oranges were often tinged with green even when perfectly ripe.<sup>57</sup> In 1939, when the supply of agricultural products was short due to bad weather, both Florida and California growers shipped oranges with green blemishes to maintain their supply. Upon the orange shipment in the beginning of the citrus season in September, the *New York Times* featured an article concerning green-colored oranges: “housewives who find oranges in the markets with a slight greenish tinge should not be afraid of their not being ripe. This green tinge is a peculiarity of the California

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<sup>55</sup> Walker, “Advertising and Publicizing,” 70. See also Florida Citrus Advertisement, *NYT Magazine*, January 12, 1936.

<sup>56</sup> “Mother Nature on Regreening Rampage,” *Citrus Magazine* 19, no. 9 (May 1957): 17.

<sup>57</sup> Alexander Todoroff, *Food Buying Today* (Chicago: Grocery Trade Publishing House, 1934), 26.

Valencia orange and has nothing to do with ripeness.”<sup>58</sup> Similarly, in the late 1940s, the Florida Citrus Commission (FCC) launched a campaign to tell consumers, in newspapers and on the radio, that a green orange was “as good as an orange orange.” The FCC explained that it was “a trick of nature” that some varieties would remain green even when the inside reached full maturity.<sup>59</sup>

Nonetheless, Florida as well as California citrus advertisers often presented bright orange and yellow colors as the sign of freshness, ripeness, and abundance for citrus fruits in the majority of their advertisements, postcards, and cookbooks. The California and Florida citrus industries’ marketing campaigns and the representation of citrus fruits in bright color images helped construct and reinforce consumers’ as well as producers’ expectations about orange color and served to naturalize the association between skin color and eating quality of the fruit. In his study on the California citrus industry, historian Douglas Sackman has shown how the CFGE reshaped the cultural significance of citrus fruits in the United States and how consumer demands in turn improved the cultivation of the fruit. He contends that the production and representation of oranges reconfigured the boundary between nature and culture. By showing colorful images, citrus advertisements materialized the culturally constructed idea about bright colored oranges, creating a “nature-culture hybridization.”<sup>60</sup> The reiteration of bright oranges as “natural produce” in

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<sup>58</sup> “Food News of the Week: Weather Cuts Supplies of Fruit, Fish and Vegetables – Color of Oranges Explained,” *NYT*, September 1, 1939.

<sup>59</sup> “Green Valencia Orange Is Ripe, Florida Tells Northern Buyer,” *New York Herald Tribune*, March 28, 1948.

<sup>60</sup> Sackman, “By Their Fruits,” 83.

advertisements reinforced the cultural assumption about the color of fruit, turning the fruit into an object, as well as a product, of culture.

### **The Influence of Color Expectations**

While corporate interests and marketing practice helped shape consumer expectations about the color of foods, consumers' and producers' strong conceptions about how food should look also influenced business as well as government activities. The case of margarine coloring presents how cultural expectations held by various groups of people, including producers, regulators, and consumers, served as one of the driving forces behind margarine regulatory policies and marketing. Legislators, dairy producers, and margarine manufacturers utilized consumer expectations about the color of butter to protect and advance their own vested interests. Moreover, state and federal governments served to define the "right" color of margarine by regulating its production and sale.

When margarine was first introduced to the United States market in 1873, the American public held a strong expectation about the color of butter as golden yellow and expected its substitute – margarine – to be also yellow. In the 1860s, French chemist Hippolyte Mège-Mouriès developed margarine, or what he called "artificial butter," under orders from Emperor Louis Napoleon III to develop an appetizing, nutritious, and cheap substitute for butter to alleviate its shortage during the Franco-Prussian War.<sup>61</sup> As a major ingredient, he used oleo oil (beef fat extracted from suet)

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<sup>61</sup> Mège-Mouriès named his butter substitute "oleomargarine" after its major ingredient, oleo oil. In the United States, the Federal Margarine Act of 1886 required manufacturers to label a butter substitute as "oleomargarine," which was defined as a

instead of milk fat to reduce the production cost. By cooking the beef fat at a low temperature (below 103°F) and churning it with milk, he made its flavor similar to butter.<sup>62</sup> To give it a look of butter, Mège-Mouriès added to the extracted fat “yellow color, which [was] employed for the ordinary butter.”<sup>63</sup> Dairy producers had traditionally added yellow colorings, including extracts of carrots, marigold, and annatto, to give butter a uniform yellow shade.

As margarine was called “the poor man’s butter,” its primary consumers were those who could not afford butter. Not only urban laborers but dairy farmers – the very

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butter substitute made of beef fat. Manufacturers also used the term “butterine” to stress an association with butter. In 1952, Congress amended the margarine act and allowed both “oleomargarine” and “margarine” to be used on margarine labels. J. S. Abbott, “The Composition and Food Value of Margarine,” Institute of Margarine Manufacturers Bulletin no. 10 (December 1930); Martha C. Howard, “The Margarine Industry in the United States: Its Development under Legislative Control” (PhD diss., Columbia University, 1951): 12; Katharine Snodgrass, *Margarine as a Butter Substitute* (Redwood City, CA: Stanford University Press, 1930), 1-2; and C. Larsen and William White, *Dairy Technology: Treating of Market Milk and Ice Cream* (New York: John Wiley & Sons, 1914), 277-78.

<sup>62</sup> Hippolyte Mège, Improvement in treating animal fats, US Patent 146,012, filed November 1, 1873, and issued December 30, 1873. When beef fat was cooked at higher temperature, the finished product attained an objectionable odor. See also Elliott G. Brackett, “The Healthfulness of Oleomargarine as an Article of Food” in Report of the State Board of Health of Massachusetts to the Legislature upon Oleomargarine, S. Rep. No.140 (1888); Henry A. Mott, *Complete History and Process of Manufacture of Artificial Butter* (New York: John F. Trow & Son, 1876); and “The Oleo-Margarin [*sic*] Industry,” *Scientific American*, March 17, 1877.

<sup>63</sup> Mège, Improvement in treating animal fats. Mège-Mouriès took out a patent in France and England in 1869 and in the United States in 1873. J. van Alphen, “Hippolyte Mège-Mouriès,” in *Margarine: An Economic, Social and Scientific History 1869-1969*, ed. J. H. van Stuyvenberg (Liverpool, UK: Liverpool University Press, 1969), 5-7; and William Clayton, *Margarine* (London: Longmans, Green, 1920), 59-60.

producers of butter – ironically depended on the cheaper substitute because of their economic limitations. For most dairy farmers, butter was an important source of income while their diet relied on a substitute.<sup>64</sup> Margarine’s yellow color provided lower-class consumers a simulated visual sensation similar to that of butter.

This identical appearance posed a threat of competition to dairy producers. The introduction of margarine to the American market occurred at a time of profound economic changes in the agrarian economy following the Civil War. Due to the development of industrial machinery, the transformation of farming systems, and the expansion of the market as well as of farmland, dairy farming as well as other agricultural production expanded rapidly, leading to overproduction and a price decline for agricultural products. In facing financial difficulties, dairy interests were resistant to the introduction of margarine, which they believed would precipitate greater competition and a price decline for dairy produce.<sup>65</sup> In fact, margarine was usually about twenty cents cheaper than butter in the American market at the turn of

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<sup>64</sup> In January 1903, a Wisconsin newspaper reported that a great number of dairy farmers of the city of Sheboygan were selling their butter and buying margarine for their own use. “Is the Oleo Law a Failure,” *Dairy and Creamery* 5, no. 3 (February 1, 1903): 11. See also, “About the Oleomargarine Law,” *Dairy and Creamery* 5, no. 4 (February 15, 1903); “Dairy Farmers Using Oleo,” *Dairy Record* 8, no. 32 (January 8, 1908): 5; and “Oleo on the Farm Table,” *American Butter Review* 4, no. 9 (September 1942): 308.

<sup>65</sup> Bureau of the Dairy Industry, USDA, “History of the Dairy Division,” October 1921, box 1, USDA Bureau of Dairy Industry Records, National Agricultural Library, Beltsville, MD; M. K. Schwitzer, *Margarine and Other Food Fats: Their History, Production and Use* (London: Leonard Hills Books, 1956), 62; and Snodgrass, *Margarine*, 12.

the twentieth century. Some retailers fraudulently sold margarine as butter by taking advantage of their similar appearance.<sup>66</sup>

In seeking to curb market competition, butter producers across the country lobbied federal and state governments for the regulation of margarine, and sent thousands of petitions to Congress.<sup>67</sup> The dairy lobbying represented approximately five million dairy farmers and thousands of creamery owners and traders. Until the late nineteenth century, due to the sheer number of dairy producers and traders and the dispersion of dairy farmers over wide areas, there had been no national institution that united individual farmers. In the late 1860s, dairy producers began establishing local organizations.<sup>68</sup> Most organized farmers on state levels, and there were interactions and networks among association leaders in different states. These early dairy

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<sup>66</sup> “Bright ‘Butter’ Was Oleo,” *Dairy Record* 10, no. 6 (July 14, 1909): 22; “Oleo as Adulterant,” *NYT*, May 23, 1886; and “The Traffic in Oleomargarine Sold as Butter,” *Brownell’s Dairy Farmer* 7, no. 5 (June 1, 1915): 6.

<sup>67</sup> Between the 1880s and 1910s, thousands of letters and petitions were sent to Congress from dairy associations and farmers. National Archives (Washington, D.C.) holds a number of petitions sent from dairy producers to Congress in the Records of the United States House of Representatives. See Committee on the Ways and Means, HR61A-H34.23, box 812; Legislations Governing the Manufacture and Sale of Oleomargarine, HR46A-H13.3; Oleomargarine, HR51A-H1.5, box 88; Petns., Memls., & Res. of State Leg. & Related Documents, HR56A. H1.7, box 121 and HR52A-H2.5, box 139-142; Petitions and Memorials, HR63A-H1.20, box 437, HR64A-H1.13, box 400, HR64A-H26.16, box 480; and Promotion of the Manufacture and Sale of Oleomargarine, HR46A-H2.4, Records of the United States House of Representatives, Record Group (RG) 233, National Archives Building, Washington D.C. See also Geoffrey P. Miller, “Public Choice at the Dawn of the Special Interest State: The Story of Butter and Margarine,” *California Law Review* 77 (1) (January 1898): 99, 122.

<sup>68</sup> In 1866, New York cheese makers established the American Dairymen’s Association. Vermont dairy producers formed a dairy association in 1869.



associations served as precursors to the national dairy lobby at the turn of the twentieth century.<sup>69</sup>

Although the amount of margarine produced in the United States never exceeded butter production until the mid-twentieth century, the margarine industry rapidly grew soon after its introduction in the early 1870s.<sup>70</sup> By the mid-1880s, there were at least eighty margarine manufacturing plants.<sup>71</sup> The United States at the time was in the midst of the transition from an agrarian state to an industrial power. A number of politicians, particularly from dairy states including New York, Wisconsin, and Minnesota, were more sympathetic to the dairy interests than newly developing industry giants, including meat packers – the major margarine manufacturers at the time. In addition, some legislators believed that margarine was an unwholesome food.

Prior to the late 1880s, neither state nor federal regulation restricted the coloring of margarine; rather they sought to regulate the entire production and sale of the product by regulating its labeling or by prohibiting its production and sale

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<sup>69</sup> For the development of dairy lobbying at the turn of the twentieth century, see Miller, “Public Choice,” 83-131.

<sup>70</sup> Ruth Dupré, “‘If It’s Yellow, It Must Be Butter’: Margarine Regulation in North America Since 1886,” *Journal of Economic History* 59, no. 2 (June 1999): 358; and Howard, “The Margarine Industry,” 75a, 208, 327a.

<sup>71</sup> “Oleomargarine,” *Report of the Dairy Commissioner of the State of New Jersey* (1886), 17; and R. A. Pearson, “Statistics of Oleomargarine, Oleo Oil, and Filled Cheese,” Bureau of Animal Industry, Dairy Division, USDA, Reprinted from the Sixteenth Annual Report of the Bureau of Animal Industry, 1899: 300. See also Commercial Manufacturing Company, *Oleomargarine Butter: The New Article of Commerce* (New York: Commercial Manufacturing, 1880), 4-5; and T. L. McAlpine, *Oleomargarine and Butterine: A Plain Presentation of the Most Gigantic Swindle of Modern Times* (New York: Judson, 1886), 2-4.

entirely.<sup>72</sup> However, the enforcement of state laws, either labeling or prohibitory, was not effective largely due to the difficulty of detecting the product. Because margarine and butter were mostly sold in bulk until the early twentieth century, even if manufacturers followed the law and labeled their products, once retailers unpacked the original package, neither state inspectors nor consumers could tell whether the mass of yellow fat was butter or margarine.<sup>73</sup>

Congress passed the federal margarine act to regulate margarine production and sale in 1886.<sup>74</sup> The act permitted the addition of color to margarine by defining it as a compound made from animal fat, such as tallow, suet, and lard, “with or without coloring matter.”<sup>75</sup> It levied a tax of two cents per pound on margarine regardless of

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<sup>72</sup> New York’s 1877 legislation was one of the first margarine regulation in the United States. New York legislators passed a bill in 1884 to forbid the production and sale of margarine entirely. In June 1885, in the *People v. Marx* case, the New York Court of Appeals declared the state’s outright prohibition of margarine unconstitutional. By the mid-1880s, seventeen states had restricted the manufacturing and sale of margarine, while seven states, Maine, Michigan, Minnesota, New York, Ohio, Pennsylvania, and Wisconsin, had enacted prohibitory laws. *People v. Marx*, 99 N.Y. 377 (1885); and *Powell v. Pennsylvania*, 127 U.S. 678 (1888). See also Richard A. Ball and J. Robert Lilly, “The Menace of Margarine: The Rise and Fall of a Social Problem,” *Social Problems* 29, no. 5 (June 1982): 489; Howard, “The Margarine Industry,” 40-42, Snodgrass, *Margarine*, 30, 46-47; and Edward Wiest, *The Butter Industry in the United States: An Economic Study of Butter and Oleomargarine* (New York: Columbia University Press, 1916), 237, 241-42.

<sup>73</sup> Howard, “The Margarine Industry,” 40-41; and Snodgrass, *Margarine*, 49-51.

<sup>74</sup> The final vote in the House was 177 for, 101 against, and 45 not voting. In the Senate, there were 37 for and 24 against. Snodgrass, *Margarine*, 36.

<sup>75</sup> “An act defining butter,” H.R. 8328, 49th Cong. (1886). The act defined butter as “the food product usually known as butter, and which is made exclusively from milk or cream, or both, with or without common salt, and with or without additional coloring matter.”

whether it was colored or uncolored. The act also imposed annual license fees on manufacturers, wholesalers, and retailers of margarine (\$600, \$480, and \$48, respectively).<sup>76</sup> As the taxing provisions were the central feature of the legislation, federal margarine regulation came within the jurisdiction of the Bureau of Internal Revenue. The Commissioner of the Bureau issued tax stamps to margarine producers, wholesales, and retailers to collect their taxes.<sup>77</sup>

Contrary to the hopes of dairy interests, the 1886 federal act did not eliminate margarine, colored or uncolored, from the market. While the number of margarine manufacturers plummeted from about eighty in 1886 to twenty in 1890, the amount of margarine produced increased steadily.<sup>78</sup> In 1887, a year after the passage of the federal act, the national production of margarine was about 22 million pounds. By

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<sup>76</sup> “An act defining butter.” Congress had first utilized its taxing power for regulatory, as well as revenue, purposes by imposing a tax on alcohol, particularly whisky, in 1791. The primary, at least official, objective of whisky taxation was to raise revenue and to fund war debt after the Revolutionary war. While butter producers also framed the margarine tax as a revenue source to justify the regulatory measure, their vested commercial interests and competition against the margarine industry pressured Congress to pass the protective legislation. William F. Shughart, *Taxing Choice: The Predatory Politics of Fiscal Discrimination* (New Brunswick, NJ: Transaction, 1997).

<sup>77</sup> Manufacturers was defined as “every person who manufactures oleomargarine for sale,” wholesalers as “every person who sells or offers for sale oleomargarine in the original manufacturer’s packagers,” and “every person who sells oleomargarine in less quantities than ten pounds at one time” was deemed a retailer. “An act defining butter”; Chris Burns, “Bogus Butter: An Analysis of the 1886 Congressional Debates on Oleomargarine Legislation” (masters’ thesis, University of Vermont, 2009); and Snodgrass, *Margarine*, 33-36.

<sup>78</sup> “Oleomargarine,” *Report of the Dairy Commissioner of the State of New Jersey* (1886), 17; Pearson, “Statistics of Oleomargarine,” 300.

1900, it had jumped to more than 100 million pounds.<sup>79</sup> Neither federal nor state regulations were effectively enforced. It was extremely difficult for the Bureau of Internal Revenue to supervise and control the collection of taxes. Inspection took time and money, more than state inspectors could manage.<sup>80</sup> As the inadequacy of state and federal laws impelled dairy interests to seek effective regulatory means, they insisted that the coloring was a critical factor for restricting margarine manufacturing and sale.

Although the coloring of margarine was never prohibited, federal and state governments began utilizing color as a means for margarine regulation in the late 1880s. Color served as a regulatory tool because margarine producers and dairy interests alike believed that consumers would not accept margarine as a butter substitute in white or any other color except yellow. Butter producers asserted that color was the primary factor that enabled margarine producers to imitate butter and that if yellow coloring was prohibited, there would be no deception or fraud. They insisted on the necessity of regulating margarine by a “disinvite color” that would enable consumers and merchants to readily tell the difference between the products on the market on sight.<sup>81</sup>

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<sup>79</sup> Howard, “The Margarine Industry,” 75.

<sup>80</sup> E. O. Grosvenor, “The Oleomargarine Questions: Should It Be Handled by National or State Authority,” *Sixteenth Annual Report of the Michigan Dairymen’s Association* (1900), 88; *Report of the Dairy Commissioner of the State of New Jersey* (1886), 8; and Snodgrass, *Margarine*, 43.

<sup>81</sup> *The Manufacture and Sale of Imitation Dairy Products* [hereafter “1886 Hearings”]: Hearings on S. Rep. 131, Before the Committee on Agriculture and Forestry, 49th Cong. 138-39, 147, 163-65, 236 (1886) (statement of R. M. Littler, James H. Seymour, Lawrence J. Callanan, and Goerge M. Harris).

As color became the central issue of margarine regulation, federal and state governments played a crucial role in determining how margarine should look on the market. Beginning in the late 1880s, an increasing number of states enacted a so-called “anti-color” law, which prohibited the manufacture and sale of yellow-colored margarine, while allowing uncolored white products. The first law to forbid the sale of margarine colored in imitation of butter was a New Jersey act of 1886, followed by Maryland in 1888. Because most margarine produced in the United States at the time was colored with yellow dyes, legislators and butter makers, as well as margarine producers, thought that an anti-color law virtually meant the elimination of margarine from the market. Dairy interests also believed that since consumers would not buy white margarine as a butter substitute, there was no need to restrict the sale of uncolored products. By 1898, twenty-six states had regulated margarine under anti-color laws.<sup>82</sup>

Court decisions not only authorized state and federal governments to regulate the coloring of margarine but also endorsed the idea that yellow was the “natural” color of butter and that margarine was “naturally” white. In 1894, the U.S. Supreme Court upheld Massachusetts’s anti-color law, establishing that margarine, “in its natural condition, [was] of ‘a light-yellowish color’” and it was “artificially colored ‘in imitation of yellow butter.’” The court concluded that the state, in the exercise of its police power, could prohibit the sale of margarine artificially colored so as to “look like genuine butter,” because such a sale might lead individuals to purchase what they

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<sup>82</sup> Howard, “The Margarine Industry,” 76. By 1903, the number of states with anti-color laws had increased to thirty-two states.

did not intend to buy.<sup>83</sup> Three justices dissented on the grounds that margarine was a wholesome, palatable, and nutritious article of food and that the statute was not limited to imitations intentionally made for a fraudulent purpose. One of the dissenters also challenged the view that the “natural color” of margarine was white:

[Margarine] is of the natural color of butter and looks like butter, and is often colored, as butter is, by harmless ingredients, a deeper yellow, to render it more attractive to consumers. The assumption that it is thus colored to make it appear to be a different article, generically, than it is, has no legal basis in this case to rest on.<sup>84</sup>

Regardless of their different opinions about whether margarine “naturally” looked like butter, the Supreme Court justices, including the dissenters, stood on the premise that the “natural” color of butter was a deep yellow shade.

While Supreme Court justices ruled the restriction of yellow coloring justifiable, a law that required margarine to be an “arbitrary” color such as pink was judged unconstitutional. In the mid-1880s, legislators in several states, including Vermont, New Hampshire, and South Dakota, passed laws that required margarine to be colored pink, intending to restrict, or virtually prohibit, the production and sale of the product, believing that pink margarine would not sell, at least as a butter substitute.<sup>85</sup> In 1898, the U.S. Supreme Court ruled New Hampshire’s pink law unconstitutional. The Supreme Court argued:

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<sup>83</sup> *Plumley v. Massachusetts*, 155 U.S. 461 (1894).

<sup>84</sup> *Ibid.*

<sup>85</sup> Howard, “The Margarine Industry,” 47-48; and Snodgrass, *Margarine*, 32. Several other states, including West Virginia, South Dakota, and Minnesota, also passed the pink margarine law in the 1890s.

Pink is not the color of oleomargarine in its natural state. The act necessitates and provides for adulteration. It enforces upon the importer the necessity of adding a foreign substance to his article, which is thereby rendered unsalable, in order that he may be permitted lawfully to sell it.<sup>86</sup>

The state legislators who passed the act and the Supreme Court judges who rejected it had different understandings of the pink law with regard to state power and constitutionality. Both sides, however, likely understood that pink was an arbitrary, “unnatural” color for margarine and that color played a significant role in determining a product’s commercial value on the market.

Not only did the Supreme Court cases represent the strong cultural expectation about the color of butter as yellow, but federal legislation also came to reinforce the association of yellow color with butter by drawing a color line between butter and margarine. In the late 1890s, agitated by the ineffectiveness of the 1886 federal margarine act, dairy interests asserted that the federal, as well as state, law should regulate margarine according to color, hoping to eliminate the product from the market while avoiding the outright prohibition of margarine production and sale. Dairy associations in the United States and Canada organized the National Dairy Union in 1894 to “secure legislation to prevent [the] fraudulent sale of butter substitutes.”<sup>87</sup> In January 1899, at its annual convention, the National Dairy Union proposed an increase of the tax rate on colored margarine to ten cents a pound from two cents in the

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<sup>86</sup> Collins v. New Hampshire, 171 U.S. 30 (1898). See also “Pink Oleo,” *Farmers’ Review*, October 2, 1895.

<sup>87</sup> “A National Dairy Union,” *Farmers’ Review*, January 10, 1894. See also *First Annual Report of the National Dairy Union* (1894); and “To Form a National Dairy Union,” *Chicago Tribune*, January 16, 1894.

previous legislation.<sup>88</sup> In December, a Vermont Representative submitted to Congress a bill based on the National Dairy Union's demand.<sup>89</sup> Butter producers believed that a ten-cent tax would make yellow margarine compete with butter by forcing producers to raise its retail price. They insisted that the primary objective of prohibiting colored margarine was to stop the deception of consumers by retailers, rather than for the interests of the dairy industry.<sup>90</sup>

Margarine proponents – mainly the livestock and cotton industries (primary suppliers of margarine ingredients), margarine manufacturers, and labor unions (representing low income consumers) – protested vehemently against the higher tax on colored margarine.<sup>91</sup> They maintained that the new legislation would be “un-American” as it would hamper fair competition and consumer choice, which they called a national virtue. Believing that there would be no demand for margarine in an

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<sup>88</sup> C. Y. Knight, “Report of the Secretary,” *Twenty-Eighth Annual Convention of the Iowa State Dairy Association*, Part IV, February 1-3, 1905, 283. See also “The 10-Cent Tax on Oleomargarine,” *Thirteenth Annual Report of the State Dairy Commissioner to the Governor of the State of Iowa* (1898), 28; and Snodgrass, *Oleomargarine*, 55.

<sup>89</sup> “Oleomargarine Bill” [hereafter “1900 Hearings”]: Hearings on H.R. 3717, Before the Comm. On Agriculture and Forestry, 56th Cong. 32-33 (1900) (statement of Rathbone Gardner).

<sup>90</sup> *Ibid.*, 87; H. C. Adams, *Addresses and Writings upon Oleomargarine and Pure Food Legislation, Dairy and Agricultural Topics* (Madison, WI: published by the author, 1902); J. W. Helmer, Jr., “Needed Dairy Legislation, and How to Secure It,” *Sixteenth Annual Report of the Michigan Dairyman's Association* (1900), 17-22; and “Status of Oleomargarine: From an Address of H. C. Adams before the Wisconsin Dairyman's Association,” *Dairy and Creamery* 3, no. 3 (February 1, 1901): 4.

<sup>91</sup> Howard, “The Margarine Industry,” 34, 50-52; and Miller, “Public Choice,” 103-104.



uncolored condition, margarine producers argued that penalizing one product for the benefit of another would contradict the principle of the fair and free market economy.<sup>92</sup> Labor union representatives pointed to the rights of consumers, especially working class people, to purchase and use yellow colored margarine. At a 1901 U.S. Senate hearing, a representative of the United Mine Workers' Association insisted on workers' right to consume yellow margarine and criticized butter producers who asserted that white margarine was "good enough" for those who could not afford butter.<sup>93</sup>

To justify the restriction of coloring margarine, dairy producers contended that color had nothing to do with the eating quality of food while they were well aware of the commercial importance of color in the butter and margarine businesses. Arguing against consumer rights, stressed by margarine interests, butter makers noted that "oleomargarinists" could still manufacture and sell "the poor man's butter" for a "poor man's price" as long as it was not colored, because the new legislation would reduce the tax on uncolored margarine.<sup>94</sup> At a 1902 hearing on margarine legislation, the

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<sup>92</sup> "The 'Free Press' Favors a Fraud," *Dairy and Creamery* 3, no. 3 (February 1, 1901): 4; C. O. Moser, *The New Margarine Picture: How It Looks to the Distressed Producers and Consumers of Home Grown Fats and Oils* (Washington, D.C.: Institute of American Fats and Oils, 1935); and *Oleomargarine Bill* [hereafter "1901 Hearings"]: Hearings on S. Res. 2043, Before the Comm. on Agriculture and Forestry, (1901).

<sup>93</sup> "1901 Hearings," 307 (statement of Patrick Dolan).

<sup>94</sup> "Oleomargarine Legislation," *Dairy and Creamery* 3, no. 22 (November 15, 1901): 9. See also "'Poor Man's Butter,'" *Dairy Record* 10, no. 13 (September 1, 1909): 17; "Poor Man's Butter," *Dairy Record* 10, no. 31 (January 5, 1910): 2-3; "The Poor Man's Butter," *Dairy Record* 10, no. 33 (January 19, 1910): 21; and "Price of Oleo Too High for 'Poor Man's Butter,'" *Dairy Record* 10, no. 8 (July 28, 1909): 18.

chairman of the National Dairy Union claimed that margarine makers could “imitate butter in taste, smell, grain, and consistency,” but there should be a line between butter and margarine based on a “characteristic by which the public [could] readily distinguish.” He declared that, because there was no nutrition in color, its omission would not make margarine less nutritious or palatable.<sup>95</sup>

The color distinction between butter and margarine became an important linchpin for federal regulation in 1902 when Congress passed margarine legislation as an amendment to the 1886 act. As the National Dairy Union had proposed, the 1902 act enforced different taxation on colored and uncolored products: a ten-cent tax (five times higher than the previous act) was imposed on “artificially colored” margarine, while a tax on uncolored product was reduced significantly from two cents to one-fourth cents. Wholesale dealers who sold only uncolored margarine were required to pay a license fee of \$200, instead of \$480 as required by the old law. The annual fee for retailers selling only the uncolored article was reduced from \$48 to \$6.<sup>96</sup> In 1904, the Supreme Court upheld the 1902 law’s constitutionality.<sup>97</sup> As a higher tax was imposed upon yellow color, yellow became a more “expensive” color. White color, rather than margarine itself, became a symbol of the “poor man’s food.”

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<sup>95</sup> *Oleomargarine and Other Imitation Dairy Products* [hereafter “1902 Hearings”]: Hearings on H.R. 9206, 57th Cong. 76, 79 (1902) (Statement of W. D. Hoard). See also Wiest, *The Butter Industry*, 256.

<sup>96</sup> The 1902 act also provided that margarine shipped from one state to another was subject to the laws of the state in which it was shipped, giving states more control over trade in oleomargarine within their borders. Gerry Strey, “The ‘Oleo Wars’: Wisconsin’s Fight over the Demon Spread,” *Wisconsin Magazine of History* (Autumn 2001): 3-15.

<sup>97</sup> *McCray v. United States*, 195 U.S. 27 (1904).

Despite the anticipation of dairy interests and legislators, however, the 1902 act had only a limited effect on the margarine business. Although margarine production decreased significantly immediately after the passage of the act, it soon recovered and rose to more than 140 million pounds by 1910 – 25 million pounds more than the amount produced in 1902.<sup>98</sup> The increase in overall margarine production was primarily due to the increase of uncolored product: after the sharp decline between 1902 and 1905, the production of white margarine began increasing. In 1903, a dairy inspector in Illinois reported that uncolored margarine was sold more generally than before in his district. Due to the lower annual license fee of six dollars, compared to the previous forty-eight dollars, and the gradual increase of margarine consumption among American consumers, many retailers, including those who had refused to sell the product before, began to take out licenses and sell uncolored margarine.<sup>99</sup>

Cultural expectations of yellow butter not only enabled legislators and dairy producers to utilize the coloration of margarine as a regulatory measure but also drove margarine producers and retailers to alter their manufacturing and merchandising practices. To evade the ten-cent tax and still offer consumers yellow margarine, manufacturers began shipping uncolored margarine, accompanied with a capsule filled

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<sup>98</sup> The production of margarine for the year after the act went into effect was 44 percent less than the preceding year. “Decline in Oleo Products,” *Dairy and Creamery* 5, no. 11 (June 1, 1903): 9; “Oleomargarine Notes,” *Dairy and Creamery* 5, no. 14 (September, 1903): 9; and Wiest, *The Butter Industry*, 258.

<sup>99</sup> “Is the Oleo Law a Failure,” *Dairy and Creamery* 5, no. 3 (February 1903): 11. See also “About the Oleomargarine Law,” *Dairy and Creamery* 5, no. 4 (February 1903): 11; and “Oleo in Kansas,” *Dairy and Creamery* 5, no. 12 (July 1903): 28.

with color solution free of charge.<sup>100</sup> As the U.S. Treasury announced in 1909 that the federal margarine law did not prohibit the inclusion of coloring matter in margarine packages, the use of color capsules became a common practice among margarine manufacturers.<sup>101</sup> By mixing the dyes with white margarine, lower-class housewives colored the product at home and served it as a substitute for butter. Kneading coloring matter into margarine required extra time and labor. Yet a color capsule became an important means for housewives to manage a family budget and to meet family members' expectations for a yellow spread.

### **Visualization of Color Expectations**

As the use of color printing increased in popular magazines and advertisements in the early twentieth century, colorful images served to represent, disseminate, and

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<sup>100</sup> The first company to supply a color capsule was one of the largest margarine manufacturers, Armour & Company. Armour & Co. Advertisement, *Chicago Tribune*, June 27, 1902; "Oleomargarine," *Sixteenth Annual Report of the State Dairy Commissioner to the Governor of the State of Iowa* (1902), 13-14; and "Oleomargarine to Be Boomed: Armour to Sell Uncolored Article with Cute Capsule," *San Francisco Call*, June 7, 1902. Food colors used for capsules included Yellow AB (FD&C No.3), Yellow OB (FD&C No.4), and annatto. Dye manufacturers, including T. Willard Ready Company (Chicago), Niles Capsule Company (Niles, Michigan), and American Edible Oil Company (Philadelphia), provided color capsules to margarine producers. Sheldon Hochheiser, "Synthetic Food Colors in the United States: A History under Regulation" (PhD diss., University of Wisconsin-Madison, 1984): 67; and W. G. Campbell to Niles Capsule Company, 30 March, 1939, box 138, entry 5, Records of the Food and Drug Administration, RG 88, National Archives, College Park.

<sup>101</sup> "Oleomargarine," *Treasury Decisions* 17, no. 22 (June 3, 1909): 51; and "Violation of Margarine Law," *Treasury Decisions* 17, no. 10 (March 11, 1909): 27-28.

reinforce cultural expectations about the “right” color of foods. The “color explosion,” as historian Roland Marchand put it, in print media during the 1920s and 1930s transformed American consumers’ visual experiences.<sup>102</sup> With the improvement in printing and photography technology, color images became a powerful selling force for many food advertisers. Enticing food images in mass-circulated print media not only stimulated consumers’ visual appetite but also offered them “color education” while propagating and standardizing their expectations.

Cookbooks and women’s magazines had long been teaching housewives how to choose foods based on color. Yet chromatic information in nineteenth-century recipes was based primarily on written texts, printed in black and white. An 1823 cookbook advised readers that a salmon should be “of fine red, (the gills particularly,) the scales bright,” and there should be “a whiteness between flakes.”<sup>103</sup> In 1893, an article in the *Ladies’ Home Journal* noted that high quality beef was “clear red in color; a pink hue signific[d] the presence of disease, while that of a dark purple indicat[e]d that death resulted from natural causes.”<sup>104</sup> Because there were no visual references in these recipes, what “clear red” color for meat meant depended largely on consumers’ experience and local market conditions.

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<sup>102</sup> Roland Marchand, *Advertising the American Dream: Making Way for Modernity, 1920-1940* (Berkeley: University of California Press, 1985), 120.

<sup>103</sup> Maria Eliza Ketelby Rundell, *American Domestic Cookery Formed on Principles of Economy for the Use of Private Families* (New York: Evert Duyckinck, 1823), 29.

<sup>104</sup> Mary Lee White, “Selection of Meat and Poultry,” *LHJ*, April 1893, 30. See also Fannie Merritt Farmer, “A Lesson on Marketing,” *BCS*, December, 1897, 204.

Late-nineteenth-century Americans did enjoy colorful images in print media. By the 1870s, lithograph companies, including Currier & Ives and Louis Prang & Company, produced elaborately colored lithograph images. Their colorful artworks and advertisements became popular means for middle-class Americans to decorate their homes and brighten an otherwise “dreary visual environment.”<sup>105</sup> Grocery stores used colorfully illustrated lithograph advertisements to catch customers’ eyes, hanging them on storefronts and walls.<sup>106</sup> A number of companies used lithographed trade cards to promote their products. Colorfully illustrated cards came in with packaged tea, coffee, soap, and various goods; retailers also distributed them to their customers. Trade cards were popular collectible items, especially for women and children.<sup>107</sup>

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<sup>105</sup> Jackson Lears, *Fables of Abundance: A Cultural History of Advertising in America* (New York: Basic Books, 1994), 268-69. Color lithograph, or chromolithography, was first used in the United States in the 1840s. In the lithographic process, ink is applied to a grease-treated image on the flat printing surface; non-image (blank) areas, which hold moisture, repel the lithographic ink. This inked surface is then printed – either directly on paper, by means of a special press (as in most fine-art printmaking), or onto a rubber cylinder (as in commercial printing). See also Pamela Walker Laird, *Advertising Progress: American Business and the Rise of Consumer Marketing* (Baltimore: Johns Hopkins University Press, 1998), 58-87; Jay T. Last, *The Color Explosion: Nineteenth Century American Lithography* (Santa Ana, CA: Hillcrest, 2005); Peter Marzio, *The Democratic Art: Pictures for a 19th-Century America* (Boston: David Godine, 1979); and Lori E. Rotskoff, “Decorating the Dining-Room: Still-Life Chromolithographs and Domestic Ideology in Nineteenth-Century America,” *Journal of American Studies* 31, no. 1 (April 1997): 19-42.

<sup>106</sup> Laird, *Advertising Progress*, 85-86. See also Lears, *Fables of Abundance*, 54-56; and Marchand, *Advertising*, 121.

<sup>107</sup> Laird, *Advertising Progress*, 77; and Susan Strasser, *Satisfaction Guaranteed: The Making of the American Mass Market* (Washington, D.C.: Smithsonian Institution Press, 1989), 164-65.

Brightly colored lithograph images pervaded all levels of distribution and sale. Crate labels provided jobbers and wholesalers with colorful images of bountiful harvests, representing the ideal appearance of fruits and vegetables. Because wholesalers' and retailers' marketing and price decisions eventually determined growers' income, growers and packers tried to catch the eyes of these middlemen at auction sites by attaching colorfully decorated labels to wooden shipping crates of fruits and vegetables.<sup>108</sup> The use of crate labels began in southern California in the mid-1880s. Packing houses and marketing cooperatives hired lithograph companies to create colorful illustrations for their labels.<sup>109</sup> Although crate labels were often discarded with the empty crates, some retailers used crates to display fruits at their stores.<sup>110</sup> Though the primary purpose of using crate labels was to attract wholesalers,

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<sup>108</sup> For the digital collection of crate labels, see Calisphere, California Digital Library, accessed January 30, 2016, <https://calisphere.org>; "Florida Southern College Fruit and Vegetable Crate Label Collection," McKay Archives Center Digital Collection, Florida Southern College, Lakeland, FL, accessed June 22, 2015, <http://archives.flsouthern.edu/cdm/landingpage/collection/labels>; and NMAH Digital Collection, accessed June 22, 2015, <http://collections.si.edu/search/results.htm?q=crate+labels&tag.cstype=all>. See also Sackman, "By Their Fruits," 94-96; and Donald D. Spencer, *Citrus Crate Labels of Florida* (Ormond Beach, FL: Camelot Publishing, 2001), 14.

<sup>109</sup> The exception to the four-color printing was the American Fruit Grower labels, which were primarily two colors: orange and blue. The size of labels varied, depending on regions. Florida and Texas labels were predominantly 9" x 9" in size, with a smaller, rectangular strip label for tangerines, whereas California and Arizona labels were 10" x 10<sup>3</sup>/<sub>4</sub>". Jerry Chicone, Jr. and Brenda Eubanks Burnette, *Florida Citrus Crate Labels: An Illustrated History* (Bartow: Bartow Printing, 1996), 85; and Jacobsen, *Pat Jacobsen's Collector's Guide*, 24.

<sup>110</sup> See Sackman, *Orange Empire*, 87.

consumers also had an opportunity to see them.<sup>111</sup> They were used until the mid-1950s, when less expensive cardboard boxes replaced wooden crates for shipping.<sup>112</sup>

Crate labels were an important tool for identifying the grade of agricultural produce as well as names of producers and packers. The label's color background stood for the grade of products: blue as grade A, red as grade B, and yellow or green as grade C.<sup>113</sup> In many cases, packers and lithographers designed crate labels so as to make their produce and names stand out in the image. According to color theory, blue and orange are complementary colors – that is, when the two colors are placed next to each other, they create the strongest contrast. The color of oranges on Grade A labels with a blue background looked more intense to viewers' eyes than oranges of other grades (Fig.11).<sup>114</sup> Labels of grade A apples often included yellowish-green as well as red apples. For instance, in a crate label for Lake Wenatchee apples with blue background (grade A), the name of the brand, "Lake Wenatchee," and the word "apples" were shown in yellow and orange to stress the color contrast (Fig.12).<sup>115</sup> In

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<sup>111</sup> Jacobsen, *Pat Jacobsen's Collector's Guide*, 1; and Sackman, *Orange Empire*, 87.

<sup>112</sup> The peak of Florida citrus crate label production was in the late 1930s when nearly 420 packing houses shipped out over 30 million boxes of fruit a year. In Florida, all labels were registered with the Florida Citrus Commission. Chicone and Burnette, *Florida Citrus Crate Labels*, 11; Hoofnagle, *Changes in the Marketing Pattern*, 8; and Spencer, *Citrus Crate Labels*, 13.

<sup>113</sup> Chicone and Burnette, *Florida Citrus Crate Labels*, 1.

<sup>114</sup> MUPU Citrus Association, Orange Crate Label, NMAH Digital Collection, c.1900-1940, accessed June 18, 2015, [http://collections.si.edu/search/tag/tagDoc.htm?recordID=nmah\\_1362016&hlterm=orange%2Blabel](http://collections.si.edu/search/tag/tagDoc.htm?recordID=nmah_1362016&hlterm=orange%2Blabel).

<sup>115</sup> Cascoa Growers, Apple Crate Label, NMAH Digital Collection, c.1900-1940, accessed June 18, 2015,



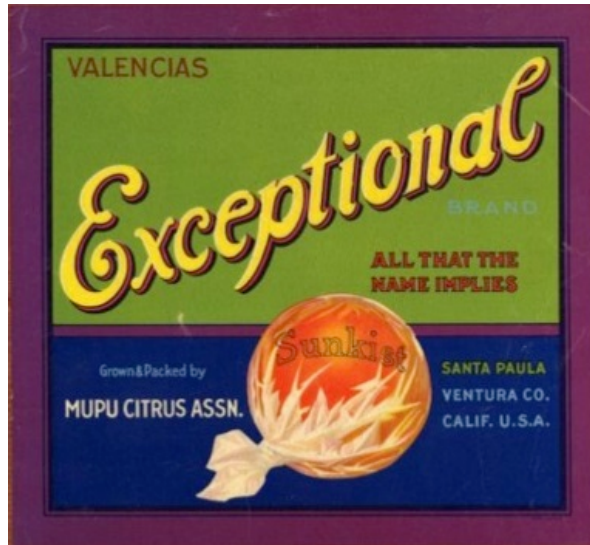


Figure 11 Grade A orange crate label. National Museum of American History Digital Collection



Figure 12 Grade A apple crate label. National Museum of American History Digital Collection.

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[http://collections.si.edu/search/tag/tagDoc.htm?recordID=nmah\\_1361639&hlterm=crate%2Blabels](http://collections.si.edu/search/tag/tagDoc.htm?recordID=nmah_1361639&hlterm=crate%2Blabels).

auction warehouses, where a number of crate boxes were stacked high, labels of higher grade produce stood out better, stressing not only the “right” color of quality products but also the association between better colored produce and higher grades.

While color lithography enriched many American’s visual experience in the late nineteenth century, it was not until the early twentieth century that the use of color pages in popular magazines expanded substantially. In the 1920s, an increasing number of advertisers and manufacturers of various goods believed that color advertisements were much more beneficial and attractive than black and white. “The outstanding, the most striking and most arresting feature of the modern magazine” was color, according to one advertising agent.<sup>116</sup> The advantage of color included its increased “attention value,” accuracy, and appeal to the emotions. Many advertisers argued that not only did color catch viewers’ attention but it also affected their actions by exerting emotional and psychological influence on them.

As color images increasingly entered into print media, the employment of color in advertisements became a controversial issue in the food as well as other industries. Color was expensive. In 1922, an advertising agent at the J. Walter Thompson Company (JWT), one of the largest advertising agencies of the 1920s, noted in an in-house newsletter that unless color played a considerable part in selling goods,

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<sup>116</sup> Einar F. Meyer, “Color Advertising in the Modern Periodical,” *Advertising and Selling* 30, no. 4 (July 17, 1920): 16. See also Hester Conklin and Pauline Partridge, “Selling Appetites through the Consumer Magazines,” *Advertising and Selling* 30, no. 7 (July 17, 1920): 12; and “Making Technique Take the Place of Color,” *Printers’ Ink* 120, no. 2 (July 13, 1922): 41-42.

its expense could not be justified.<sup>117</sup> In the mid-1920s, although a number of leading women's magazines reduced the rate for color printing, the cost of four-color space was nearly 50 percent higher than the cost of black and white.<sup>118</sup> Besides cost, the quality of color reproduction was not satisfactory: shades were often unnatural and it was practically impossible to mass-produce color images with uniform results.<sup>119</sup> In his 1925 book on illustration techniques in advertisements, a *Printers' Ink* columnist contended that by employing a black-and-white illustration skillfully with "immeasurable detail and a close adherence to realism," monochrome images, with their "artistic charm and novelty," could "overcome somewhat the handicap of lack of color, in the midst of color."<sup>120</sup> Some advertisers even believed that because people

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<sup>117</sup> Peirce Johnson, "Getting the Most Out of Color," JWT Newsletter, no. 87, June 1922, box MN5, JWT, Newsletter Collection, Rubenstein Library. See also W. Livingston Larned, *Illustration in Advertising* (New York: McGraw-Hill, 1925), 242.

<sup>118</sup> "Collier's Will Have Four-Color Printing," JWT Newsletter no. 92, August 6, 1925, box MN7, JWT, Newsletter Collection; "A Comparison between the Increase in the Color Page Rates and the Growth in Circulation of Women's Magazines," JWT Newsletter no. 12, January 31, 1924, box MN6, JWT, Newsletter Collection; "McCall's Has Reduced Rate for Color Inserts," JWT Newsletter no. 90, July 23, 1925, box M7, JWT, Newsletter Collection; and Guy Richards, "Shall We Use Color?" *Printers' Ink Monthly* 13, no. 1 (July, 1926): 99. In the mid-1920s, color print rates (per 1,000 pages) for major women's magazines were as follows: *Ladies Home Journal*, \$5.15; *McCall's*, \$5.26; *Woman's Home Companion*, \$5.34; *Pictorial Review*, \$5.49; *Butterick Combination*, \$5.70; *Good Housekeeping*, \$6.20.

<sup>119</sup> Sally Stein, "The Rhetoric of the Colorful and the Colorless: American Photography and Material Culture between the Wars" (PhD diss., Yale University, 1991): 141.

<sup>120</sup> Larned, *Illustration in Advertising*, 242, 244. See also Mabel J. Stegner, "The Art of Advertising Food," *Commercial Photography* 3, no. 9 (June 1928): 405.

were surrounded by all kinds of colors in nature, black and white would even look “novel” and catch consumers’ eyes more effectively than color images.<sup>121</sup>

Nonetheless, by the mid-1920s, advertising agents, printing firms, and manufacturers of various goods had come to generally believe that color was more effective particularly for attracting female consumers.<sup>122</sup> Advertisers contended that women were more susceptible to colors, so that the extra cost for four-color printing would be worth spending in order to appeal to “feminine interest.”<sup>123</sup> In the mid- to late-1920s, many women’s magazines increasingly featured four-color printing, which presented more vivid images and “faithful pictorial effects” than two-color images.<sup>124</sup>

As food was one of the products that was believed to be purchased predominantly by women, food companies were among the principal users of color in

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<sup>121</sup> Richards, “Shall We Use Color,” 43.

<sup>122</sup> “Food Advertisers Aid American Art,” *Printers’ Ink Monthly* 14, no. 4 (April, 1927): 54. See also W. Livingston Larned, “The New Spirit in Color Advertising,” *Printers’ Ink Monthly* 6, no. 6 (June 1923): 131; M. Luckiesh, “The Attention Values of Color in Advertising,” *Advertising and Selling* 30, no. 3 (July 10, 1920): 16; M. Luckiesh, “The Effectiveness of Color Display,” *Advertising and Selling* 30, no. 3 (August 7, 1920): 25; and Richards, “Shall We Use Color,” 44, 98-99.

<sup>123</sup> “Food Advertisers Aid American Art,” 54. See also Patricia Johnston, *Real Fantasies: Edward Steichen’s Advertising Photography* (Berkeley: University of California Press, 1997), 242.

<sup>124</sup> Richards, “Shall We Use Color,” 98. See also “Use of Four Color Advertising Continues to Increase,” JWT Newsletter no. 108, November 27, 1925, box MN7, JWT, Newsletter Collection; and Richard A. Dunne, “What Is the Trend in the Use of Color,” JWT Newsletter no. 123, July 1925, box MN5, JWT, Newsletter Collection.

their promotion materials, believing that color would “whet the appetite.”<sup>125</sup> “The food producer these days has learned to say less about his products and to show them more, at the same time taking advantage of the growing habit of the American people to see what they eat before they select it,” a 1926 article in the trade journal *Citrus Industry* declared. The author emphasized the importance of eye appeal, particularly the color reproduction in advertisements, in selling oranges as well as other agricultural produce.<sup>126</sup> As more advertisers turned to color images and as popular magazines began reducing their prices for color pages, colorful images of foods increasingly appeared in advertisements, giveaway cookbooks, and popular magazines.

The California citrus industry and canning companies were some of the earliest advertisers in the food industry to carry out extensive national promotion using color printing. Since the early 1910s, the California Fruit Growers Exchange (CFGE) had utilized colorful images of citrus fruits in various promotion materials, reinforcing the association between an orange shade and ripe oranges. From the beginning of the century, canning companies, such as Del Monte, Libby’s, and Campbell’s, also employed color printing in their advertisements and product labels, usually showing not only the outer appearance of a can but also fruits and vegetables served on a plate (Fig. 13). Luscious halves of perfect peaches in glowing yellowish-orange color, fresh green asparagus and peas, and a shining yellow hue of pineapple slices adorned

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<sup>125</sup> Larned, “The New Spirit,” 132-34. See also Conklin and Partridge, “Selling Appetites,” 12; “Food Advertisers Aid American Art,” 54; and “Color in Newspaper Advertising,” *Printers’ Ink Monthly* 28, no. 2 (February, 1934): 62.

<sup>126</sup> E. J. Clary, “The ‘Eye Appeal’ in Fruit Merchandising,” *Citrus Industry* 7, no. 2 (February 1926): 6.

Packed where they ripen the day they are picked.

**Del Monte**  
BRAND  
EXTRA  
QUALITY

★  
**Del Monte—A Guarantee**

The red Del Monte shield is a guarantee of quality covering a whole line of canned fruits and vegetables.

It stands for the finest fruits that can be cultivated in the finest orchards in the whole sunny state of California, and for such vegetables as only the most favored garden sections can grow.

It stands for canning methods that retain all the natural goodness of the fruit, all its delicate flavor, all its mellow lusciousness. Del Monte fruits are "canned where they ripen the day they are picked" under the direct supervision of men who have devoted their whole lives to this one line of work.

Del Monte canned fruits bring the very sunshine of California to your table. You will find helpful menu suggestions in the whole Del Monte line as it includes many varieties of canned fruits and vegetables, as well as jams, jellies and preserves, olives, catsup, raisins and prunes—all of the same dependable Del Monte quality. At leading grocers everywhere.

"GOOD THINGS TO EAT"—a 64-page book in colors of new and unusual recipes. This book, by the well-known cooking expert, Marion Harris Neil, is a revelation of the innumerable ways of preparing tempting and delicious desserts and salads from Del Monte canned fruits and vegetables. Send 10 cents in stamps addressed to Dept. B.

CALIFORNIA  
PACKING CORPORATION  
SAN FRANCISCO  
CALIFORNIA

**Del Monte**  
BRAND  
EXTRA  
QUALITY  
PEACH

Figure 13 Del Monte advertisement. *Ladies' Home Journal*, March 1918.

canned food advertisements and labels.<sup>127</sup> By identifying certain foods with distinctive colors (such as tomatoes with bright red, pineapples with vivid yellow, and peaches with brilliant yellowish-orange), these idealized images helped construct and teach consumers the strong connections between a certain food and a specific shade.

In competing against California growers, some of the Florida citrus industry's advertisements utilized color images to present that the uniform bright color was not always the sign of delicious fruits. In the early twentieth century, the Florida Citrus Exchange (FCE), the largest Florida citrus cooperative, commissioned well-known home economist Christine Frederick, who wrote numerous articles for women's magazines and published *Selling Mrs. Consumer* in 1929, to write a recipe booklet to promote Seald Sweet brand oranges (Fig.14). The FCE asserted that the color of orange skins would "tell nothing"; instead, the brand name Seald Sweet "tells you everything." The booklet also included color images not only of brightly colored oranges but also of citrus fruits with gray blemishes, suggesting that all Florida oranges, regardless of their appearance, were high quality.<sup>128</sup> Likewise, a 1925 advertisement for Sealed Sweet oranges and grapefruits, printed in the *Ladies' Home Journal*, presented discolored fruits with grayish color and green tinges. The advertisement noted: "Florida oranges, whether they are bright, golden or russet in

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<sup>127</sup> Del Monte began its first national promotion campaigns in 1917 and was one of the earliest canning companies that carried out mass advertising. William Braznell, *California's Finest: The History of Del Monte Corporation and the Del Monte Brand* (San Francisco: Del Monte, 1982), 45-46, 90-93.

<sup>128</sup> Christine Frederick, *Seald Sweet Cook Book* (Tampa, FL: Florida Citrus Exchange, n.d.), box 11, Product Cookbooks Collection, 1874-1990, Archives Center, NMAH. According to the FCE's other advertisements and booklets for the Seald Sweet brand, the booklet was published probably around the 1920s and 1930s.



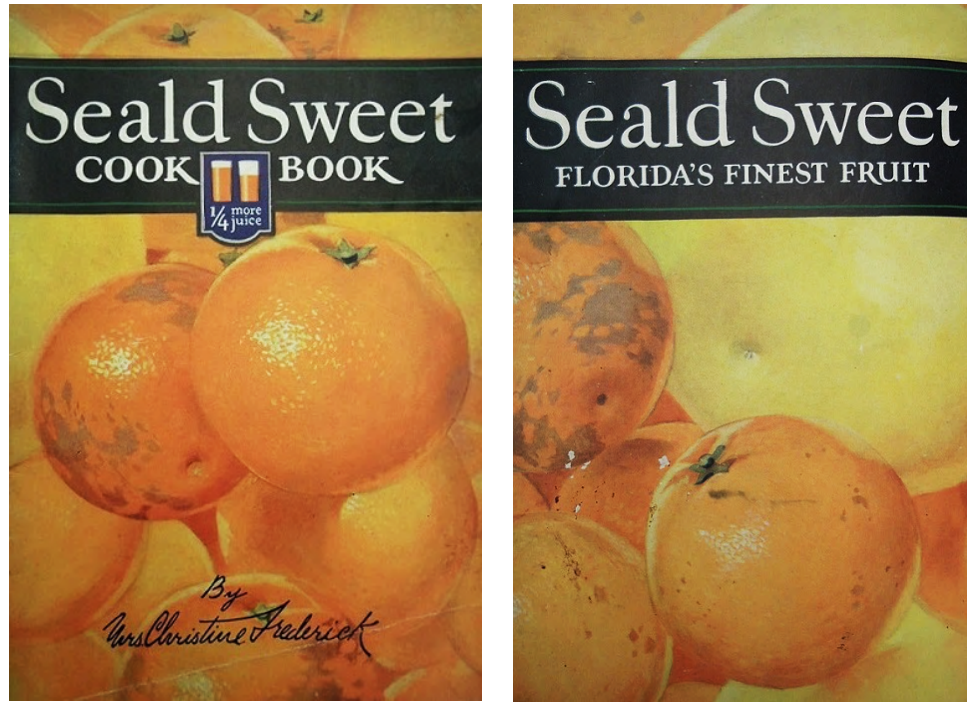


Figure 14 “Sealed Sweet Cook Book” (front and back covers), n.d. Product Cookbooks Collection, National Museum of American History, Smithsonian Institution.

color, are equally juicy and palatable.”<sup>129</sup> Florida citrus advertisers’ effort to deemphasize the appearance of oranges suggested not only the intense competition between Florida and California but also strong consumer expectations about the connection between bright orange color and the eating quality of the fruit, on which Florida growers and packers sought to “reeducate” consumers.

Well into the early twentieth century, not only did food advertisers use color printing to attract consumers’ eye and palate, but they also reinforced the popular perception about the color of food by teaching consumers how to determine the proper

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<sup>129</sup> Seald Sweet Advertisement, *LHJ*, January 1925, 82-83.



stage of ripeness for eating fruits. The Fruit Dispatch Company, a subsidiary of United Fruit, often explained how to tell bananas' ripeness based on their skin colors, usually with a color illustration, printed in recipe leaflets and advertisements (Fig.15).<sup>130</sup> Yellow color with a green tip indicated that the pulp was still firm and starchy; the fruit should be left at comfortable room temperature to become completely ripe or

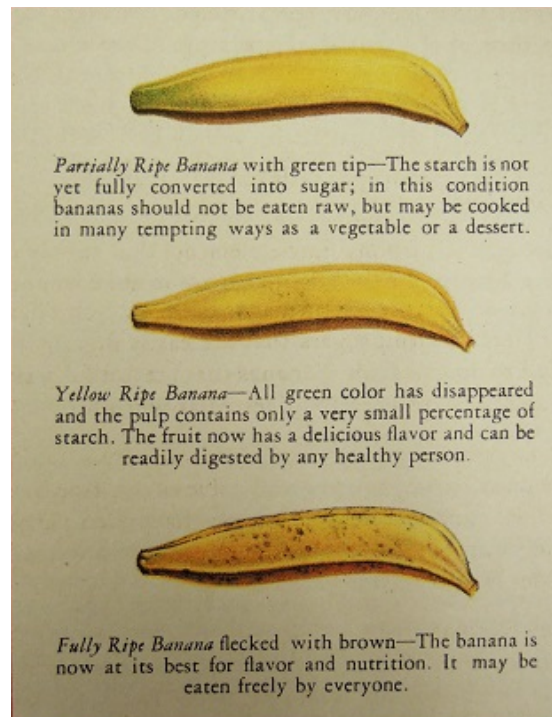


Figure 15 Fruit Dispatch Company, “From the Tropics to Your Table: Eighty-Three Tested Banana Recipes,” 1926. Product Cookbooks Collection, National Museum of American History, Smithsonian Institution.

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<sup>130</sup> Fruit Dispatch Company, “From the Tropics to Your Table: Eighty-Three Tested Banana Recipes,” 1926, box 4, Product Cookbooks Collection, NMAH; Fruit Dispatch Company, “A Study of the Banana: Its Every-day Use and Food Value,” 1942, box 4, Product Cookbooks Collection, NMAH; and Fruit Dispatch Company Advertisement, *LHJ*, March 1926.

should be cooked. When the skin became all yellow, bananas reached the “yellow ripe” stage, suggesting that most of the starch had turned to sugar and the fruit attained a delicious flavor. Bananas at that stage could be readily digested and were still firm enough for cooking. Yellow color with brown flecks was the sign of “full ripe” stage at which all starch was converted into sugar and was easily digested. The flavor developed to “its highest delicacy.”<sup>131</sup> Instructions on banana ripeness reflected nutritionists’ and home economists’ concerns about the digestibility of the fruit at the time. Since the nineteenth century, these professionals had warned consumers not to eat raw fruits and vegetables in general and advised housewives to cook them long enough to enhance their digestibility. Many authorities also considered eating foods raw as a uncivilized practice.<sup>132</sup> As eating raw bananas had become a popular way of consuming the fruit by the early twentieth century, yellow color served as a marker of eating quality, suggesting that raw bananas were safe for eating.

Fruit shipping companies and cooperatives also provided “color education” for wholesalers and retailers. By the mid-twentieth century, the Standard Fruit and Steamship Company (the predecessor of the Dole Food Company) had begun distributing to grocers a color poster that showed different stages of banana ripeness based on skin colors. Shipping companies usually transported bananas to retailing

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<sup>131</sup> Fruit Dispatch Company, “A Study of the Banana.” See also Fruit Dispatch Company, “From the Tropics”; and “Bananas in the Modern Manner: Recipes, Menus, and Suggestions for Housewife and Hostess,” 1930, box 1930s-6, Nicole De Bona Peterson Collection of Advertising Cookbooks, Rubenstein Library.

<sup>132</sup> For instance, home economists recommended one to three hours’ boiling for string beans and forty-five minutes for asparagus. Laura Shapiro, *Perfection Salad: Women and Cooking at the Turn of the Century* (New York: Modern Library, 2001), 90; and Soluri, *Banana Cultures*, 38-39.

premises when the fruit was still green and unripe to provide the optimum quality at grocery stores. The color guide poster enabled retailers to determine when to bring bananas from their backyards to the sales floor. When the skin was still greenish yellow but assumed a “more yellow than green” shade, the fruit was “ready for retail display.” This ripening stage of bananas kept a longer shelf-life than fully ripened fruits; grocers hence had lower product loss, while consumers could cook the fruit or wait until the banana became fully yellow.<sup>133</sup>

The naturalness and harmony of color in published images were critical for the presentation of foods. According to a JWT agent, by the mid-1920s, the appetite appeal of illustrations of cured meats, especially hams and bacons, had been improved by “the discovery of a certain shade of orange” in color reproducing.<sup>134</sup> Since the late 1890s, meat packing companies, including Swift and Armour, had been running national advertising campaigns for cured meats, but their advertisements had been printed mostly in black and white. Some meat packers published color advertisements and recipe leaflets, but the industry was relatively slow in employing color media for their promotion materials.<sup>135</sup> As the use of color printing rapidly grew among food manufacturers throughout the 1920s and 1930s, meat packers began presenting both fresh and cured meat products in bright pink and reddish shades. The improvement in

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<sup>133</sup> Standard Fruit and Steamship Company, “Retail Color and Temperature Guide,” n.d., box 8, Henry B. Arthur Papers, Baker Library, HBS.

<sup>134</sup> “Swift & Company Account Histories,” February 1926, box 41, JWT, Account Files, Rubenstein Library.

<sup>135</sup> Ibid.

color printing technology enabled meat advertisers to recreate the “natural” color of meat products.

The relationships between the color of meat and product quality were by no means “natural”; rather the idea that a bright red shade was an indication of good quality meat was historically and culturally constituted. Traditionally, words such as *bright* and *cherry red* were used to describe the preferred color of meat, particularly beef, and *white* and *creamy white* for beef fat.<sup>136</sup> The yellow color of fat and tissues sometimes was a sign of disease.<sup>137</sup> The fat of aged animals also assumed a yellowish color; hence the meat was usually tougher than younger cows.<sup>138</sup> Yet in many cases the color of fat varied from white to straw color and yellow, depending on the kinds of cattle feed: when cows were fed primarily on corn or grass, fat assumed a deep yellow color. Moreover, the color of meat did not always indicate eating quality: meat color turned to gray or brown with little change in taste, though grayish and brown shades could suggest bacteria infection. Partly due to the association with disease and aged meat, government inspectors usually graded bright red meat with creamy-white fat higher, and these were the colors consumers found in meat advertisements, recipe

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<sup>136</sup> M. A. Price, “Development of Carcass Grading and Classification Systems,” in *Quality and Grading of Carcasses of Meat Animals*, ed. S. D. Morgan Jones (Boca Raton, FL: CRC Press, 1995), 188.

<sup>137</sup> Thomas Walley, *A Practical Guide to Meat Inspection* (New York: William R. Jenkins, 1895), 14, 33.

<sup>138</sup> H. W. Norton, “Meat Demonstration,” *Sixteenth Annual Report of the Pennsylvania Department of Agriculture* (1910), 530.

leaflets, and cookbooks.<sup>139</sup> A food purchasing manual for housewives, published in 1934, asserted that the color of good beef was “bright cherry red and the flesh firm and fine grained, well mottled with a creamy-white fat and having a good outer covering of brittle, flaky, white fat.”<sup>140</sup> Meat packers’ promotions of a particular color of meat and the industry’s grading served to create consumer expectations about good meat colors, while colorful illustrations in advertisements and cookbooks helped consumers visually understand how “good” meat should look.

Advertising agencies, printing companies, publishers, and “color consultants” played an important role in promoting the use of color printing in mass-circulated media during the 1920s and 1930s. “Color [was] the National salesman,” the U.S. Printing & Lithography Company declared to advertisers in a 1923 *Printers’ Ink Monthly*.<sup>141</sup> Another printing company claimed in its 1929 advertisement to ad agencies that a “nation’s habits can be changed by the winsome coloring of Lithographed Advertising.” Featuring a colorful Sunkist advertisement as an example,

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<sup>139</sup> Charles A. Burmeister, Herman M. Conway, and Albert P. Brodell, “Economic Factors Affecting the Beef-Cattle Industry of Virginia,” USDA Technical Bulletin no. 237 (April 1931): 51.

<sup>140</sup> Alexander Todoroff, *Food Buying Today* (Chicago: Grocery Trade Publishing House, 1934), 83. See also Armour & Company, Department of Home Economics, “Meat Selection, Preparation and Many Ways to Serve,” 1934, Hagley Museum and Library; and “Meat Grades at Your Service,” *Consumers’ Guide* 4, no. 15 (October 18, 1937): 19. See also “U.S. Graded Beef,” *Consumers’ Guide* 2, no. 10 (March 11, 1935): 11.

<sup>141</sup> U.S. Printing & Lithography Company Advertisement, *Printers’ Ink Monthly* 6, no. 6 (June 1923): 101.

the firm stressed the “sales success” assured by color images.<sup>142</sup> Because color pages were more profitable than black-and-white pages, publishers also encouraged advertisers to use color printing. Beginning in 1925, the Curtis Publishing Company accepted color pages only in four colors, printed in the *Ladies’ Home Journal*. If advertisers wanted to use two colors, they needed to pay the rate for four-color printing. Moreover, the firm required advertisers to publish at least six four-color pages in the *Journal* within a year.<sup>143</sup>

When color was still a new medium in the 1920s, consultant Faber Birren provided various industries with advice on the effective use of colors. In a 1929 *Printers’ Ink* article, Birren insisted that “color strategy in advertising [did] not entirely concern the artist’s palette.” The “province of color” did not lie “solely within the realm of art” or “some sort of godly genius,” rather color was a “democratic” and “scientific” thing. Advertisers should hence understand the usefulness and function of color in a more practical manner. Color would for instance serve to distinguish goods and brands from those of competitors and arouse consumers’ attention. Color in advertisements could also present a “realistic” image of products.<sup>144</sup>

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<sup>142</sup> Lithography Advertisement, *Printers’ Ink Monthly* 19, no. 1 (July 1929). Many other lithograph and printing companies published advertisements in advertising industry trade journals.

<sup>143</sup> “Ladies Home Journal,” JWT Newsletter no. 92, August 6, 1925, box M7, JWT, Newsletter Collection.

<sup>144</sup> Faber Birren, “Color Strategy in Advertising,” *Printers’ Ink Monthly* 18, no. 2 (February, 1929): 40. See also Faber Birren, *Selling with Color* (New York: McGraw-Hill Book, 1945); and Birren, “Work from the Product to Color,” *Printers’ Ink Monthly* 18, no. 3 (March, 1929): 46. For the work of Faber Birren, see Regina Lee Blaszczyk, *The Color Revolution* (Cambridge, MA: MIT Press, 2012), 215-40.

After the financial crash of 1929, advertisers of various products began increasing the use of color images to bring attention to their sales messages.<sup>145</sup> While many firms lost the financial means for advertising, those businesses able to pay for color printing sought to stimulate consumer demand by featuring their products in color. As photography historian Sally Stein has argued, the cultural climate of the Depression was “especially receptive to viewing the world in color.”<sup>146</sup> Color served as a “salient form of the mass commodification of pleasure” and played a prominent role in the spread of mass culture.<sup>147</sup> Colorful images provided a sense of happiness and gaiety as well as lively tones to American consumers during the unprecedented economic hardship.<sup>148</sup>

In the 1930s, a new medium appeared in the food advertising scene: the use of color photography gradually increased. Most of the earlier color images had not been “truthful” enough, as these had been so-called pen-and-ink illustrations drawn by designers. Even when photographed, the reproduced image had often looked unnatural without sufficient technology.<sup>149</sup> In the late 1920s, criticizing the poor quality of color

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<sup>145</sup> Michel Frizot, ed., *A New History of Photography* (Köln: Könemann, 1998), 419; Paul Martineau, *Paul Outerbridge: Command Performance* (Los Angeles: Getty Publications, 2009), 9; and Sylvie Pénichon, *Twentieth-Century Color Photographs: Identification and Care* (Los Angeles: Getty Publications, 2013), 80.

<sup>146</sup> Lears, *Fables of Abundance*, 236-38; and Stein, “The Rhetoric,” 198.

<sup>147</sup> Stein, “The Rhetoric,” 191.

<sup>148</sup> Stephen R. Milanowski, “Factors Influencing the Neglect of Color Photography 1860 to 1970” (masters’ thesis, Massachusetts Institute of Technology, 1982): 59-60; and Stein, “The Rhetoric,” 198-99.

<sup>149</sup> Elspeth H. Brown, *The Corporate Eye: Photography and the Rationalization of American Commercial Culture, 1884-1929* (Baltimore: Johns Hopkins University

photography, a JWT agent had insisted that a great amount of photographic work was “uninteresting and tiresome” because of a look of “cheapness.”<sup>150</sup> The technological development of color photography reproduction in the 1930s met advertisers’ and food producers’ quest for “true” color and “real” images of goods.<sup>151</sup>

Many advertising agencies asserted that photography brought to food advertising a convincing actuality and great credibility, while a pen-and-ink drawing, even when it was in color, presented only a “pictorial fantasy.”<sup>152</sup> Color photography was also, in a sense, a “pictorial fantasy” since its composition and colors were usually carefully manipulated by photographers. Yet food advertisers believed that the

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Press, 2005), 162-63; and Bruehl-Bourges, *Color Sells: Showing Examples of Color Photography* (New York: Condé Nast, 1935), n.p.

<sup>150</sup> “Additional Comments on the Pen-Camera Controversy...” JWT Newsletter no. 186, August 15, 1927, box MN8, JWT, Newsletter Collection. See also Lou Ingwersen, “Yes, the Lens Lends a Hand!” JWT Newsletter no. 186, August 15, 1927, box MN8, JWT, Newsletter Collection.

<sup>151</sup> A process called “carbro” became the dominant color printing technique in the advertising industry in the 1930s because of its stability, color range, vivid color, and fidelity. The Carbro process, patented in 1905 as the Ozobrome, was adapted from carbon printing techniques developed in the 1850s. The name “carbro,” which combined the words carbon and bromide, was coined in 1919 by H. F. Farmer. It was first adopted by the Autotype Company of London for its own line of products. Carbro remained the dominant process used for the advertising industry until the 1950s when it was displaced by the easier and less expensive method. Elspeth H. Brown, “Rationalizing Consumption: Lejaren à Hiller and the Origins of American Advertising Photography, 1913-1924,” *Enterprise and Society* 1, no. 4 (December 2000): 715-38; Johnston, *Real Fantasies*, 28, 31-33; Martineau, *Paul Outerbridge*, 9; and Pénichon, *Twentieth-Century Color Photographs*, 80, 99. See also Frank Young, *Modern Advertising Art* (New York: Covici, Friede, 1930).

<sup>152</sup> William Clive Duncan, “Photographing the Appetite Appeal,” *Commercial Photography* 4, no. 7 (April 1929): 330-31, 333; and Stegner, “The Art of Advertising Food,” 407. See also Johnston, *Real Fantasies*, 30-31.



actuality and reality that photographic images provided would serve as an effective selling tool by presenting the appetite appeal of the product since consumers would see the image as a scene from the actual world rather than a painter's imagination.<sup>153</sup>

With the rise of advertising agencies, as the production of commercial photography became increasingly professionalized during the 1930s and 1940s, the use of photography for print media expanded. Publishers and advertising agencies made an exclusive contract with commercial photographers, who provided their work for editorial pages and advertisements in national magazines.<sup>154</sup> JWT, for instance, offered prominent commercial photographer Edward Steichen a renewable contract from 1924 to 1935.<sup>155</sup> In 1932, photographer Anton Bruehl began working for the publisher Condé Nast with the publisher's color technician Fernand Bourges as a team. Condé Nast published *Color Sells* in 1934 to publicize the work of Bruehl and Bourges, emphasizing that color would create new markets, attract attention, and

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<sup>153</sup> "Newspaper Color," *Printers' Ink Monthly* 34, no. 1 (January 1937): 78. See also "Color in Newspaper Advertising," *Printers' Ink Monthly* 28, no. 2 (February 1934): 62; Duncan, "Photographing the Appetite Appeal," 329; and "Many New Uses Are Being Found for Photographs of Fruit," *Commercial Photography* 11, no. 8 (May 1936): 295.

<sup>154</sup> For the history of the professionalization and commercialization of advertising photography, see Brown, *The Corporate Eye*, esp. chap. 4; and Johnston, *Real Fantasies*. For the development of food photographers as a profession, see Margaret McAlpine, *Working in the Food Industry* (New York: Gareth Stevens, 2006); Charlotte Plimmer, *Food in Focus* (New York: Amphoto, 1988); and Ron Stark, *Delicacies: A Personal View of Food through the Art of Photography* (New York: Morrow, 1978). These books are written mostly by practitioners. Scholars have not fully explored or written about the history of food photography.

<sup>155</sup> Brown, *The Corporate Eye*, 213-14; and Johnston, *Real Fantasies*, 42-43.

display the merchandise better.<sup>156</sup> The book included color advertisements of sixty-six companies, including food manufacturers such as Coca-Cola, Heinz, Kellogg, and General Mills, that had used Bruehl-Bourges's color photographs.<sup>157</sup> The McCall's magazine commissioned Nickolas Muray, a photographer and Olympic fencer, to create color photographs for its homemaking and food pages from 1935 to 1945.<sup>158</sup> Muray's food photography in vivid color images provided viewers with idealized and standardized, yet "realistic," food images.

With sharply focused, carefully composed, and lusciously colored photographs, food advertisers sought to teach consumers the "real" images of their products and to whet the appetite. They asserted that the effectiveness of photography lay in its "explanatory power" rather than simply its "esthetic" element.<sup>159</sup> The use of color photography for food advertisements did not exceed the number of pen-and-ink

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<sup>156</sup> The team of Anton Bruehl and Ferdinand Bourges was so successful that between 1932 and 1934 they produced 479 color photographs for advertisers primarily with Condé Nast. Their advertisements appeared primarily in *Vogue*, *Vanity Fair*, and *House and Garden*. Milanowski, "Factors Influencing," 53. See also John Rohrbach, *Color: American Photography Transformed* (Austin: University of Texas Press, 2013).

<sup>157</sup> Bruehl-Bourges, *Color Sells*.

<sup>158</sup> Biographical Material, 1931-1964, Nickolas Muray Papers, Archives of American Art, Washington, D.C.

<sup>159</sup> Leonard W. Smith, "Why Don't We Let the Eyes Have It?" *Commercial Photography* 9, no. 5 (February 1934): 138. See also "Margaret Bourke-White on Color Photography and Photo-Murals," *Commercial Photography* 9, no. 7 (April 1934): 193; I. Moore, "Sell It with COLOR!" *Printers' Ink Monthly* 34, no. 4 (April, 1937): 28; and Chas. N. Tunnell, "New Opportunities for Photographs in the Food Field," *Commercial Photography* 13, no. 11 (August 1938): 424.

illustrations until the mid-twentieth century.<sup>160</sup> Yet the shift to color photography was certainly under way. When magazines and advertisements were increasingly filled not only with colors but also with “real” images of photography, those print media gave new visual sensations to consumers who had seen primarily black-and-white and pen-and-ink images before. By “explaining” their products in color photography, advertisers believed that they could reproduce and present images of how food “really” looked like more effectively than color lithography or other illustrative media.

### **Conclusion**

With the dramatic changes in politics, economy, and technology, food manufacturers’ and traders’ commercial interests became one of the primary factors that reformulated and standardized ideas about how food should look. Creating the “right” color of foods was a learning process for many groups of people – producers, traders, government officials, advertisers, and consumers. Government regulation, the opinions of experts and authorities, and corporate interest in selling particular colors of foods helped define, legitimize, and naturalize how food should look. The expansion of color printing in various media helped teach the “right” color of foods not only to consumers but also to producers and traders. As the controversy over margarine color reveals, producers’ and consumers’ strong expectations about the yellow color of butter in turn had a far-reaching influence on margarine production, marketing, and

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<sup>160</sup> For instance, in the January and February 1935 issues of the *Ladies’ Home Journal*, there was about the same number of food advertisements with photography as pen-and-ink illustrations. *LHJ*, January and February 1935.

regulation. Consumers' strong perceptions about the color of butter as well as of oranges hindered producers and advertisers from successfully marketing products with a "unnatural" look, such as white margarine and green ripe oranges. To successfully compete in the national market and to convince consumers of high quality, food advertisers emphasized, and sometimes de-emphasized, the importance of color in selecting foods. By regulating their competitors and promoting their own products, food producers utilized consumer expectations about the color of certain food products in the interest of commercial success.

### Chapter 3

#### CREATING “NATURAL” COLORS

“The growing, the preparing, and the marketing of many of the products of the farm are becoming questions of art and psychology,” a scientist in the U.S. Department of Agriculture (USDA) proclaimed in the 1904 USDA Yearbook. He paid particular attention to the importance of appearance, especially color, in selling agricultural products. The author argued that as the population was becoming increasingly urban, they no longer knew the “real” taste of produce; these “townspeople” hence bought foods “often not primarily for the gratification of taste, but upon the testimony of the eye.” To cater to “consumers’ fancies” for beautiful color, producers controlled the color of a wide range of foods, including butter, bananas, oranges, tomatoes, and meat.<sup>1</sup> While analyzing consumers’ increasing preference for foods with bright, uniform color, the article suggested that the production of what now looked “natural” required human manipulation.<sup>2</sup>

Through careful control, producers created the color of foods as a hybrid of nature and artifice.<sup>3</sup> Consumers’ and producers’ ideas about “naturalness” were

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<sup>1</sup> George K. Holmes, “Consumers’ Fancies,” U.S. Department of Agriculture (USDA) Yearbook, 1904: 417-34.

<sup>2</sup> Ibid.

<sup>3</sup> For discussion about the natural environment as “hybridity,” see William Cronon, *Nature’s Metropolis: Chicago and the Great West* (New York: W. W. Norton, 1991); Donna Haraway, “The Promises of Monsters: A Regenerative Politics for

historical and cultural construction, and producers created a “natural” color by using various color-controlling technologies. As the previous chapter has shown, popular perception about how food should look was a product of political, economic, and cultural negotiations among legislators, producers, advertising agents, and consumers. In building on the discussion about where cultural expectations came from, this chapter explores the ways food producers sought to meet the expectations by actually manipulating the color of foods. Consumer demands for “natural” foods and producers’ efforts to create the “natural” color and to maximize their profits created *naturalness* as a complex characteristic of foods.

A history of creating “natural” food color was a history of taming “nature.” Since the beginning of agriculture, human beings had been manipulating the natural environment by selecting certain crops to accommodate seasonal and regional conditions and by inter-breeding different varieties to increase productivity and improve quality. Yet until the late nineteenth century, the appearance, as well as taste, of agricultural produce varied widely, depending on varieties, climate conditions, seasonal changes, and available technologies. Tomatoes were not always uniformly

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Inappropriate/d Others,” in *Cultural Studies*, eds. Lawrence Grossberg, Cary Nelson, and Paula Treichler (New York: Routledge, 1992): 295-337; Douglas Cazaux Sackman, “‘By Their Fruits Ye Shall Know Them’: ‘Nature Cross Culture Hybridization’ and the California Citrus Industry, 1893-1939,” *Citriculture and Southern California*, *California History* 74, no. 1 (Spring 1995): 82-99; Paul S. Sutter, “The World with Us: The State of American Environmental History,” *Journal of American History* 100 (1) (June 2013): 94-119; Richard White, “From Wilderness to Hybrid Landscapes: The Cultural Turn in Environmental History,” *The Historian* 66 (3) (September 2004): 557-64; Richard White, *The Organic Machine: The Remaking of the Columbia River* (New York: Hill and Wang, 1995); and Donald Worster, “Transformations of the Earth: Toward an Agroecological Perspective in History,” *Journal of American History* 76, no. 4 (March 1990): 1087-06.

red, and there were different colors and varieties, including yellow and green. Not all apples attained bright red, or green, shades. Some oranges assumed a greenish tinge.<sup>4</sup>

The late nineteenth to the mid-twentieth century marked a crucial moment in this history of human manipulation of the natural environment – a moment when the advent of new agricultural machinery and chemical substances, as well as the development of refrigerated transportation and storage technology, allowed agricultural producers and traders to control the color of their produce effectively and uniformly, allowing for a new level of manipulation and standardization. By exploring how government officials, scientists, food producers, and consumers envisioned the relationships between the natural and artificial, this chapter demonstrates that the creation of standardized, uniform color of foods emerged from a set of practices and beliefs, including the government’s attempt to regulate as well as to boost food production and marketing, producers’ desire to control the environment and create sustained profits, and changing consumer expectations about what was natural and appetizing.

In his study of the “industrial chicken,” historian William Boyd has explored how nature was “made to act as a force of production” by focusing on the acceleration of chicken reproduction. He argues that agro-industrialization not only transformed the economic and social practices of agriculture, food production, and diet in the

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<sup>4</sup> For the global history of food production and agriculture from the ancient time to today, see Reay Tannahill, *Food in History*, rev. ed. (New York: Three Rivers Press, 1995); and Maguelonne Toussaint-Samat, *A History of Food*, trans. Anthea Bell (Cambridge, MA: Blackwell, 1992).

twentieth-century United States but also facilitated a “profound restructuring of the relationship between nature and technology.”<sup>5</sup>

Not only did food manipulation by producers construct the hybridity of food color, but food consumption practices also helped shape and transform the naturalness of color. Environmental historian John Soluri has delineated how mass markets shaped, and were shaped by, ecosystems by analyzing the relationships between a banana production site in Honduras and the American consumer market. His study has illuminated nature, labor, and consumption as critical factors in the expansion of American and global capitalism.<sup>6</sup>

Environmental and biological conditions resulted in what many producers and consumers considered an “unnatural” color. Yet it was economic, social, and cultural factors that constructed the line between the “natural” and “unnatural.” For example, while Florida’s peculiar environmental circumstances produced ripe oranges with green skins, it was popular expectations about “good” oranges that problematized the green color fruit. In certain parts of Southeast Asia and East Asia where oranges ripened without a change in skin color in early autumn as in Florida, one of the most common orange varieties was (and is) marketed in green as well as in orange,

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<sup>5</sup> William Boyd, “Making Meat: Science, Technology, and American Poultry Production,” *Technology and Culture* 42, no. 4 (October 2001): 633.

<sup>6</sup> John Soluri, *Banana Cultures: Agriculture, Consumption, and Environmental Change in Honduras and the United States* (Austin: University of Texas Press, 2005); and John Soluri, “Banana Cultures: Linking the Production and Consumption of Export Bananas, 1800-1980,” in *Banana Wars: Power, Production, and History in the Americas*, eds. Steve Striffler and Mark Moberg (Durham, NC: Duke University Press, 2003): 48-79. See also John Soluri, “Accounting for Taste: Export Bananas, Mass Markets, and Panama Disease,” *Environmental History* 7, no. 3 (July 2002): 386-410.



depending on the time of cultivation.<sup>7</sup> In these countries, the green color of some orange skins indicated varietal and seasonal differences; in the United States, to many consumers' eyes, orange signified the "natural" color of ripe, fresh oranges regardless of seasons or varieties. Many agricultural producers manipulated their products to give them the color of what consumers considered "natural," believing that food with "unnatural" colors – green oranges, white butter, and brown meat – would not sell in the national market even if the eating quality of the product was perfectly fine.

Food producers, government officials, and scientists deemed the industrialization of agriculture and the standardization of product quality, including color, as an indispensable factor for the effective production and marketing of agricultural produce. Between the 1860s and 1920s, American farm producers encountered and engendered considerable changes in the agrarian economy. During the decades following the Civil War, the industrialization and expansion of agricultural production resulted in overproduction and a price decline for agricultural produce. The outbreak of World War I alleviated the farm problem in the United States. American farmers became suppliers of agricultural products for European markets. After the war, however, as European demands for American produce decreased, overproduction brought a dramatic price decline, leading to the economic degradation of rural areas.<sup>8</sup> Increasing the marketability of fruits and vegetables and farmers' income became important national issues.<sup>9</sup>

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<sup>7</sup> John McPhee, *Oranges* (New York: Farrar, Straus and Giroux, 1966), 10.

<sup>8</sup> For the transformation of agricultural production and the farm problem, see David B. Danbom, *The Resisted Revolution: Urban America and the Industrialization of Agriculture, 1900-1930* (Ames, IA: Iowa State University Press, 1979); Deborah Fitzgerald, *Every Farm a Factory: The Industrial Ideal in American Agriculture* (New

## The Elimination of Natural Variation

The “correction” of natural variations was essential for food producers to be able to supply uniform products consistently throughout the year regardless of regions or seasons. Butter and meat products exemplify how producers manipulated and standardized product colors that changed depending on environmental and animals’ biological conditions. The creation of “natural” color was a process of standardization, and the color became increasingly alienated from the actual taste of food.

### *Making Butter “Look Like Butter”*

At least since the early nineteenth century, dairy farmers had colored butter and cheese with carrot juice and extracts of plant seeds, called annatto, to give them a “natural” yellow all year round.<sup>10</sup> The shade of butter depended on the kind of cattle

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Haven: Yale University Press, 2003); David E. Hamilton, *From New Day to New Deal: American Farm Policy from Hoover to Roosevelt, 1928-1933* (Chapel Hill: University of North Carolina Press, 1991); and Robert Paarlberg and Don Paarlberg, “Agricultural Policy in the Twentieth Century,” *Agricultural History* 74, no. 2 (Spring 2000): 136-61.

<sup>9</sup> For contemporary discussion about agricultural marketing, see L. C. Corbett, “A Successful Method of Marketing Vegetable Products,” *USDA Yearbook*, 1912: 353-62; Dick J. Crosby, “Agriculture in Public High Schools,” *USDA Yearbook*, 1912: 471-82; Clyde L. King, “From the Farm to the Consumer,” *Independent* 74, no. 3355 (March 20, 1913): 635-38; A. J. Lynn, “Marketing Farm Products” (PhD diss., Indiana University, 1916); J. Clyde Marquis, “Advertising as an Aid to Direct Selling,” *Annals of the American Academy of Political and Social Science* 50 (November 1913): 197-202; G. Harold Powell, “Cooperation in the Handling and Marketing of Fruit,” *USDA Yearbook*, 1910: 391-406; “Report of the Secretary,” *USDA Yearbook*, 1913: 26-31; and Louis Dwight Harvell Weld, *The Marketing of Farm Products* (New York: Macmillan, 1916). See also Charles J. Brand, “What the Government Is Doing Toward Better Production and Better Distribution,” *Scientific American*, August 12, 1916, 154-56.

<sup>10</sup> “Cheese Making,” *Cultivator* 1, no. 4 (April 1854): 133-34; and “Coloring Butter with Carrots,” *Country Gentleman Cultivator* 7, no. 6 (February 7, 1856): 92.

feed, the breed of cows, and the period of lactation. During the summer months, especially from late May to June, when cows were fed on green pasture, rich in yellow pigments called carotene and xanthophyll, the color of butter was bright yellow.<sup>11</sup> In autumn and winter, when the pastures began to dry up and cows were primarily fed on dry roughage and grains, butter became faintly yellow. The Channel Island cattle breeds generally produced a more highly yellow butter than Holsteins and Ayrshires. At the beginning of the period of lactation (usually early summer), cream and butter had a deeper shade of yellow than after the cows had been milked for some months in winter.<sup>12</sup> The carotene-rich fresh feeds of early summer also added richer flavor, as well as more nutrients, to butter. The bright yellow color signified for producers and consumers better eating quality.<sup>13</sup> Dairy farmers and merchants often referred to the bright color of early summer butter as “June shade” and considered it the “natural” and “standard” color of butter (Fig.16).<sup>14</sup>

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<sup>11</sup> L. S. Palmer, “The Yellow Color in Cream and Butter,” University of Missouri-Columbia, Agricultural Experiment Station Circular no. 74 (April 1915). See also Sewall Guthrie, *The Book of Butter: A Text on the Nature, Manufacture and Marketing of the Product* (New York: MacMillan Company, 1918), 148.

<sup>12</sup> Otto F. Hunziker, *The Butter Industry: Prepared for the Use of Creameries, Dairy Students and Pure Food Departments* (LaGrange, IL: published by the author, 1920), 300-301; and “Use of Coloring in Butter,” *Prairie Farmer*, September 26, 1907.

<sup>13</sup> Palmer, “The Yellow Color,” 41-46.

<sup>14</sup> See for instance F. S. Burch, *ABC Butter Making, Hand-Book for the Beginner* (Chicago: C. S. Burch, 1888), 30-31; “June Butter in Winter,” *Farm, Field, and Fireside*, February 25, 1899; John McCabe, Address at the Women’s Civic League, St. Paul, February 1, 1912, cited in “Oleomargarine,” *Dairy Record* 12, no. 36 (February 7, 1912): 6; G. I. McKay and C. Larsen, *Principles and Practice of Butter-Making* (New York: John Whey & Sons, 1906), 238-39; and “The True June Shade,” *Elgin Dairy Report* 14, no. 39 (February 27, 1905): 1.



## EVERY month is June with Fairmont's Better Butter

IN JUNE, butter reaches its perfection of fine-flavored goodness. Then—the grass is new and green and plentiful. The streams are clearest. The breezes sweetest. And the cows, reveling in tender pasturage, put all this goodness into their milk and produce the richest, finest-flavored cream of all the year.

How we discovered Nature's secret that gives June cream that extra goodness, is one of the romances of this business.

In Fairmont's Better Butter you will find that June perfection every day—month in and out. A matchless, wholesome goodness that enriches the taste and healthfulness of everything you eat, of which butter is a part. To maintain this June quality we cheerfully spend \$250,000 a year. Not one pound of our butter wins the Fairmont Better Butter label unless it meets this standard—absolutely.



Fairmont's Better Butter is made out in the heart of America's finest dairying country. Made by Fairmont experts in great, modern creameries under the most exacting sanitary conditions. Every pound is packed in triple-sealed cartons, that conserve every whit of the marvelous flavor, and shipped by fast refrigerator-trains to market. Every pound comes to your table as fresh and sweet as the day it was churned. Ask your grocer for—

## FAIRMONT'S

### *Better Butter*

—a part of EVERY GOOD MEAL



Fairmont's Better Eggs are always good—Fairmont's Better Poultry is full milk-fed—Fairmont's Better Cheese is always tasty—Fairmont's Better Milk is always wholesome.

Figure 16 Fairmont's Butter advertisement, 1925. NW Ayer Records, National Museum of American History, Smithsonian Institution.

Until the early twentieth century, dairy products had been almost wholly processed on the farm, and their quality depended on the skill and resource of individual farmers. Butter was not uniform, and sometimes poor in quality due to a lack of knowledge, equipment, and financial means.<sup>15</sup> As butter making was a sideline

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<sup>15</sup> Henry E. Alvord, "Dairy Development in the United States," USDA Yearbook, 1899: 381-402; Charles E. North, "Memorandum Regarding Dr. North's Nursery

business for many dairy farmers, they were often reluctant to make costly investments, such as cooling appliances, which were necessary to prevent cream from souring.<sup>16</sup> The production of butter at factories (called creameries) had begun in New York during the early 1860s and later in other states. Dairy farmers brought their milk to the creamery, where it was churned into butter and shipped to the market.<sup>17</sup> The quality of creamery butter was generally more uniform, and many dairy producers and consumers considered it better than butter made on the farm. Yet the operation of early creameries remained on a small scale. It was not until the late 1910s that the production of creamery butter exceeded the amount of butter produced by individual farmers.<sup>18</sup>

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Butter,” box 12, Charles E. North Papers, National Agricultural Library Special Collections, Beltsville, MD. See also Geoffrey P. Miller, “Public Choice at the Dawn of the Special Interest State: The Story of Butter and Margarine,” *California Law Review* 77 (1) (January 1898): 89; and Xerxes A. Willard, *Willard’s Practical Butter Book: A Complete Treatise* (New York: Excelsior, 1875), 61.

<sup>16</sup> “Butter-Making on the Farm,” *Prairie Farmer*, June 16, 1900; Kenneth D. Ruble, *A Man to Remember: How 100,000 Neighbors Made History* (Chicago: R. R. Donnelley, 1947), 48; Ralph Selitzer, *The Dairy Industry in America* (New York: Magazines for Industry, 1976); and Kendra Smith-Howard, *Pure and Modern Milk: An Environmental History Since 1900* (New York: Oxford University Press, 2014), 44.

<sup>17</sup> Smith-Howard, *Pure and Modern Milk*, 36.

<sup>18</sup> In 1899, about 70 percent of butter was produced on the farm while factory production accounted for 30 percent. In 1909, the farm production of butter still exceeded factory production: 61 percent and 39 percent respectively. H. E. Erdman, *American Produce Markets* (Boston: D. C. Heath, 1928), 37; Katharine Snodgrass, *Margarine as a Butter Substitute* (Redwood City, CA: Stanford University Press, 1930), 17-23, 309-11; and Edward Wiest, *The Butter Industry in the United States: An Economic Study of Butter and Oleomargarine* (New York: Columbia University Press, 1916), 11-43. See also Hunziker, *The Butter Industry*, 18-22; W. R. Pabst, Jr., *Butter and Oleomargarine: An Analysis of Competing Commodities* (New York: Columbia University Press, 1937), 1-17.

There was often a disparity between the ideal butter making that dairy industry leaders promoted and the actual dairying practiced by farmers. Officials of federal and state government agriculture departments, leaders of dairy associations, and university scientists tried to educate dairy farmers about the significance of color in the butter business and “scientific” ways of making butter.<sup>19</sup> In 1905, for example, the U.S. Department of Agriculture (USDA) published a Farmers’ Bulletin, “Butter Making on the Farm,” to inform farmers of the “well defined laws” of butter making.<sup>20</sup> In trade journals and farm newspapers, dairy associations published articles on how to maintain uniform color throughout the year while warning farmers not to “overlook the color” of butter especially during fall and winter.<sup>21</sup> They contended that because butter had always been dyed with yellow colors and consumers assumed it was always yellow, the coloring of butter was a necessary practice to make butter “look like butter” at all times of year.<sup>22</sup>

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<sup>19</sup> For dairy manuals, see Willis P. Hazard, *Butter and Butter Making with the Best Methods for Producing and Marketing It* (Philadelphia: Porter & Coates, 1877); Hunziker, *The Butter Industry*; McKay and Larsen, *Principles and Practice*; Pabst, *Butter and Oleomargarine*; and Willard, *Willard’s Practical Butter Book*. These manuals were also used as textbooks at land grant universities.

<sup>20</sup> Edwin H. Webster, “Butter Making on the Farm,” USDA Farmers’ Bulletin no. 241 (1905).

<sup>21</sup> “Don’t Overlook the Color,” *Dairy Record* 11, no. 11 (August 17, 1910): 2.

<sup>22</sup> R. M. Washburn, Address at the National Convention of Pure Food Workers, Jamestown, VA, July 16-19, 1907, cited in “Color in Butter,” *Dairy Record* 8, no. 9 (July 24, 1907): 7. Washburn’s address was featured in several publications under the same title “Color in Butter.” See, for instance, *American Food Journal* 2, no. 8 (August 15, 1907): 41-42; *Country Gentleman* 72, no. 2846 (August 15, 1907): 765-66; *Jersey Bulletin and Dairy World* 26, no. 7 (July 24): 984; and *Pacific Rural Press*, August 17, 1907. See also Burch, *ABC Butter Making*, 30; and “Oleomargarine and Other Imitation Dairy Products, Etc.” S. Rep. No. 2043 (January 26, 1901); “Coloring

The lighter color of winter butter was primarily a product of environmental conditions, but it became producers' responsibility to "correct" undesirable shades to what consumers and producers considered the "natural" color of butter. Industry leaders and government officials often complained that farmers guessed the amount of food dye put into the churn. Such "carelessness" did not achieve uniformity in the finished product.<sup>23</sup> Believing that color was one of the few factors in butter making over which producers had absolute control, they advised farmers to gradually increase the coloring matter, so that the butter would appear uniform at all times.<sup>24</sup>

Dye manufacturers promoted the commercial importance of color for the dairy business by advertising their products for coloring butter. By the 1880s, dye makers, including the Christopher Hansen's Laboratory Company; Wells, Richardson & Company; and the Heller & Merz Company, had introduced "butter colors" – food

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Butter," *Dairy and Produce Review* 3, no. 8 (August 7, 1902): 2; and "More about Oleomargarine," *Dairy Record* 12, no. 36 (February 7, 1912): 10.

<sup>23</sup> James Sorenson, "Practical Butter Making," *Dairy Record* 15, no. 27 (December 3, 1913): 27.

<sup>24</sup> "Advised to Color Butter," *Farm, Field, and Fireside*, July 26, 1902; C. B. Cochran, "Butter Colors," Pennsylvania State Department of Agriculture Bulletin no. 13 (1886); "Butter Color," *Farmers' Review*, January 5, 1907; "Butter-Making on the Farm," *Prairie Farmer*, June 16, 1900; "Color Butter Higher," *Dairy and Produce Review* 5, no. 25 (December 3, 1903): 2; "Don't Forget the Color," *Dairy Record* 11, no. 28 (December 14, 1910): 8; "Don't Overlook the Color"; "Remarkable Workmanship as to Color and Salt," *Dairy Record* 12, no. 39 (February 28, 1912): 12; "How to Color Butter," *Wallace's Farmer*, January 15, 1904; "In the Dairy," *Farmer's Wife*, June 1, 1907; "June Butter in Winter," *Farm, Field, and Fireside*, February 25, 1899; Sorenson, "Practical Butter Making"; and "The True June Shade," *Elgin Dairy Report* 14, no.39 (February 27, 1905): 1.

dyes prepared specifically for coloring butter.<sup>25</sup> Butter color manufacturers publicized their products extensively in dairy trade journals, farm newspapers, and butter making manuals. They also distributed colorful trade cards to promote their company names and products and to stress the significance of coloring butter in “June shade” (Fig.17). Since color was an essential factor that determined the grade and commercial value of butter, dye makers touted the economic benefit of their products. “Better butter color means bigger butter profits” – in its 1916 advertisement, Wells, Richardson stressed the higher profitability of the “rich golden hue” of butter dyed with its product.<sup>26</sup> With such phrases, butter color makers stressed that only a few cents invested in their products would bring dollars to the pockets of dairy farmers.

By using packaged dyes, dairy farmers could color butter without going through the time consuming processes of extracting juice from carrots and annatto. These packaged coloring solutions also helped standardize the color of butter. When individual dairy farmers made their own coloring solution from various ingredients, the color of dyes and of butter differed significantly among producers. In fact, the uniformity of color was one of the qualities that butter color makers stressed to their customers. In its 1905 advertisement, Wells, Richardson claimed that its butter color product always gave butter “the true June shade”: “It never varies – it never fades.”<sup>27</sup>

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<sup>25</sup> Burch, *ABC Butter Making*, 30; Guthrie, *The Book of Butter*, 149; McKay and Larsen, *Principles and Practice*, 239; and Charles A. Publow, *Questions and Answers on Buttermaking* (New York: Orange Judd Company, 1911), 32.

<sup>26</sup> Wells, Richardson Advertisement, *Chicago Dairy Produce* 23, no. 2 (May 1916): 17. See also “Color Sells Butter,” *Wallace’s Farmer*, February 6, 1920; and “Make More Money This Easy Way,” *Farmer’s Wife*, January 1, 1931.

<sup>27</sup> Wells, Richardson Advertisement, *Elgin Dairy Report* 14, no. 39 (February 27, 1905): 1.





**HOW TO INCREASE THE VALUE OF BUTTER.**

**Bean & Perry's Natural June Butter Color has No Equal!**

**We claim for it Every Point Wanted in a Perfect Butter Color.**

To every dairymen who wishes to obtain the highest degree of excellence in his productions we wish to call attention to the following reasons why we claim superiority over all others:

- 1st.—It does not color the butter-milk.
- 2nd.—It contains no acids or alkalies, consequently works uniformly, no matter what degree of sourness the cream may possess.
- 3rd.—It gives the butter a Natural June Color.
- 4th.—Butter prepared with it gives the highest market price.
- 5th.—It is entirely harmless, saves time, labor, and returns you twenty dollars for every one dollar invested.
- 6th.—It imparts no taste to the butter, but improves the flavor and keeping qualities.
- 7th.—Perfect keeping qualities. It does not mould, sour or spoil in any way. It has a decided tendency to preserve butter.
- 8th.—It requires no labor, as it is a liquid that is put in with the cream in the churn.

It has been an almost invariable rule at the many fairs and dairy shows held in the last two years, that butter colored with this color has carried off the highest premiums. It is the strongest endorsement possible of its merits. This is the only color in the market which is positively guaranteed to give perfect satisfaction.

Put up in three sizes, 25c., 50c., and \$1.00 per bottle; also by the gallon.

**BEAN & PERRY MFG. CO.,**  
Sole Proprietors and Manufacturers. **ROCKFORD, ILL.**

For sale by all Druggists and Grocers.

Figure 17 Bean & Perry Mfg. Co., butter color trade card, n.d. Warshaw Collection, National Museum of American History, Smithsonian Institution.

Butter color makers promoted the use of their specific brands as well as the coloring of butter in general by taking active part in contests sponsored by local dairy associations. At a contest, a group of judges, usually officials from the state dairy department and cooperative representatives, ranked butter and cheese manufactured by creameries and individual farmers. Butter color makers offered cash prizes to those who won using the company's dyes. In the early 1910s, for instance, the Preservaline Manufacturing Company offered a five-dollar cash prize to the butter maker using its dye product who scored highest at the Minnesota State Fair.<sup>28</sup> Butter color producers often publicized that contest winners used their products, seeking to demonstrate the quality of their products.<sup>29</sup>

The creation of the "natural" color in butter making required knowledge about market demands. What consumers considered a "natural," or "good," color of butter varied widely depending on the market. Butter makers and traders generally understood that consumers in the South preferred a deep yellow butter, while the eastern and northern markets demanded a lighter shade.<sup>30</sup> Many butter merchants in Chicago claimed that they had no trouble selling butter with a light color and some even asserted that a highly colored product was not popular among consumers in the

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<sup>28</sup> "Butter Color Prize at State Fair," *Dairy Record* 15, no. 11 (August 13, 1913): 27. See also "Butter Color Prizes," *Dairy Record* 15, no. 19 (October 8, 1913): 6; and "Premiums," *Sixteenth Annual Report of the Michigan Dairyman's Association* (Lansing, MI: Wynkoop Hallenbeck Crawford, 1900): 117

<sup>29</sup> See for instance "Butter Color Needed Now"; "Used in the Best Butter," *Farm, Field, and Fireside*, May 20, 1899.

<sup>30</sup> Hunziker, *The Butter Industry*. See also McKay and Larsen, *Principles and Practice*; and Oleomargarine and Other Imitation Dairy Products, Etc. S. Rep. No. 2043 (January 26, 1901).

city.<sup>31</sup> Butter making manuals and trade journals often warned dairy farmers to color their butter to suit the taste of the market and constantly to ask their customers about their preference while providing uniform quality for the customer. In his 1920 butter making manual, Otto F. Hunziker, a pioneer and one of the authorities in the American dairy industry, observed that many butter makers often “overestimated” the public demand and tended to color butter with “a deeper shade than necessary or desirable.”<sup>32</sup> While Hunziker warned butter makers to be more attentive to consumer demands, he did not question whether the butter coloring practice was necessary or legitimate; rather he even promoted the practice of giving butter uniform colors. For Hunziker and many other butter makers, “artificial” coloration was an indispensable means for creating what consumers believed “natural” colors.

#### *Creating “Natural” Meat Color*

Maintaining an attractive “natural” color was an important marketing factor also in transforming animal flesh into standardized commodities. At the turn of the twentieth century, supplying good colors of meat became essential for meat packers and dealers to show that their products were fresh and perfectly fine for eating. The advent of the giant meat-packing industry altered American meat consumption patterns dramatically. Due to the expansion of the national market and the development of long-distance transportation, urban consumers increasingly came to purchase cuts of meat that had been dressed in meat-packing plants thousand miles away. Until then, livestock shippers had transported the whole animal to butchers near

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<sup>31</sup> “Advised to Color Butter.”

<sup>32</sup> Hunziker, *The Butter Industry*.

the market who cut the meat in their storage rooms, usually according to order. Meat packers and retailers needed to convince consumers that pre-dressed meat, shipped from faraway meat packers, was not spoiled and was as good as cuts freshly butchered in nearby retail stores. The health threat due to spoiled meat was one of the largest concerns for consumers. The color of meat, as well as its odor, was a prime sign of diseases and spoilage.<sup>33</sup>

The transformation of meat merchandising practice also made meat color more important than ever before for retailers. In the late nineteenth century, an increasing number of retail butchers began displaying cuts of meat in display cases. Traditionally, few wholesalers and retail butchers had displayed meat to customers. The bulk of their meats hung as carcasses in a cooler (usually in a back room). A pioneer in initiating meat display was Gustavus Swift, who later established Swift & Company – one of the largest meat-packing firms throughout the late nineteenth and twentieth centuries. In the 1870s, when Swift operated a butcher shop in Clinton, Massachusetts, he realized that when the products were on display in stores, housewives were likely to buy more meat on impulse.<sup>34</sup> A large assortment of cuts caught customers' eyes. Color was an important element for customers to determine the quality of meat. In fact,

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<sup>33</sup> Cronon, *Nature's Metropolis*, 212, 234-35; and Roger Horowitz, *Putting Meat on the American Table: Taste, Technology, Transformation* (Baltimore: Johns Hopkins University Press, 2006), 19.

<sup>34</sup> Louis F. Swift, *The Yankee of the Yards: The Biography of Gustavus Franklin Swift* (Chicago: A. W. Shaw, 1927): 75-76. See also Cronon, *Nature's Metropolis*, 237.

many cookbooks of the late nineteenth and early twentieth centuries informed housewives of ways to select good quality of meat based largely on color.<sup>35</sup>

The careful treatment of animals was essential for meat packers to prevent “unnatural” colors. Meat color resulted from a complex mixture of various factors, including the breed, age, and sex of animals, the type of feeding, the part of meat, animals’ physical conditions, and slaughtering operations.<sup>36</sup> Meat from older animals tended to be darker in color. When the flesh of an animal was overheated before slaughter due to a long drive or excitement, it often assumed a dark “fiery appearance” and frequently developed a sour odor after slaughtering.<sup>37</sup> A 1913 meat packing manual noted that “no animal should be killed after a long drive or rapid run about the pasture” and it was “always better in such cases to permit the animal to rest over night rather than to risk spoiling the meat.”<sup>38</sup> In the early twentieth century, knocking or stunning cattle was the major means of slaughtering animals. But these methods

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<sup>35</sup> See for instance Mary Johnson Bailey Lincoln, *Mrs. Lincoln’s Boston Cook Book: What to Do and What Not to Do in Cooking* (Boston: Roberts Brothers, 1884), 210-11, 214, 232, 245; and Maria Parloa, *Miss Parloa’s New Cookbook: A Guide to Marketing and Cooking* (New York: C.T. Dillingham, 1880), 10, 30, 36.

<sup>36</sup> “Here Are Facts on Color Changes,” *National Provisioner* 143, no. 27 (December 31, 1960): 10; Jerry Lee Mautz, “A Discussion of the History and Development of the In-Store Merchandising and Packaging of Fresh Red Meat with Emphasis on the Effect of Polyvinyl Chloride Film on a Traditional Cellophane Market” (masters’ thesis, Michigan State University, 1966): 25-26; and Gordon L. Robertson, *Food Packaging: Principles and Practice* (New York: Marcel Dekker, 1993), 433.

<sup>37</sup> B. Heller & Co., *Secrets of Meat Curing and Sausage Making: How to Cure Hams, Shoulders, Bacon, Corned Beef, Etc., and How to Make All Kinds of Sausage, Etc., and Comply with All Pure Food Laws* (Chicago: B. Heller, 1913), 186.

<sup>38</sup> *Ibid.*

tended to prevent free blood flow and caused discoloration of the flesh. Another packing manual, published in 1905, warned packers about the potential loss of profits due to “undue violence” such as striking animals across the back with heavy sticks or prodding them unnecessarily. Great care needed to be taken to promote the free flow of blood and prevent the discoloration of meat, the author advised.<sup>39</sup>

Meat packers used various additives to give cured meat products, including bacon, sausages, and hams, the “natural” red color of meat. Various kinds of sweeteners, including glucose and corn syrup, brightened and stabilized the red color, as well as added flavor to the finished product.<sup>40</sup> According to the USDA’s 1921 report, cane sugar generally provided cured meats with more luscious colors than corn sugar. Bacon cured with granulated cane sugar turned golden yellow when fried; whereas bacon cured with corn sugar tended to turn light- or dark-brown.<sup>41</sup> Chemical companies also promoted a substance called dextrose, derived from glucose, for enhancing and maintaining the “natural” color of cured meats.<sup>42</sup>

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<sup>39</sup> F. W. Wilder, *The Modern Packing House* (Chicago: Nickerson and Collins, 1905), 72-73. See also B. Heller, *Secrets of Meat Curing*, 75-76, 186.

<sup>40</sup> The practice of adding glucose and corn syrup is still a part of sausage making processes today. See Elton D. Aberle, et al., *Principles of Meat Science*, 4th ed. (Dubuque, IA: Kendall/Hunt, 1989), 143-44; Nicholas J. Russell and G. W. Gould, *Food Preservatives* (New York: AVI, 1991); and Rodrigo Tarté, *Ingredients in Meat Products: Properties, Functionality and Applications* (New York: Springer, 2009).

<sup>41</sup> Ralph Hoagland, “Substitutes for Sucrose in Curing Meats,” USDA Bulletin no. 928 (January 7, 1921): 22.

<sup>42</sup> See Corn Products Sales Company Advertisements, *National Provisioner* 101, no. 10 (September 2, 1939): cover; and *National Provisioner* 101, no. 23 (December 2, 1939): cover.

As the use of synthetic dyes became increasingly common in the food industry in general in the early twentieth century, meat packers also used them for cured meat products.<sup>43</sup> A chemical manufacturer in Chicago, William J. Stange Company, provided food dyes in “exact-weight” packages, which allowed meat packers to add uniform colors to the finished product consistently without having to measure the dyes.<sup>44</sup> Another Chicago chemical company, B. Heller & Company, advertised various preservatives and dyes for coloring sausages and hams in its 1901 meat packing manual: the company’s dye “makes a NATURAL, BRIGHT, FRESH MEAT COLOR, and when used properly an expert *can not tell* that the color in sausage is artificial” [emphasis in the original].<sup>45</sup> The advertisement suggested that the artificial coloring was indispensable for producers to create the finished product’s “natural” appearance.

B. Heller’s advertisement also indicated that since even “an expert” would not be able to detect the dyes used in meat products, meat packers did not have to worry about food regulation in making the “natural” color of sausages, hams, and other products. During the 1900s, a number of states, as well as the federal government, began enacting regulation on food coloring. In 1901, a year after the advertisement was featured in B. Heller’s manual, Wisconsin prohibited the “artificial coloring” of

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<sup>43</sup> McArthur, Wirth & Company, *Butchers’ and Packers’ Tools and Machinery* (Syracuse, NY: the company, 1900), 74-76.

<sup>44</sup> Wm. J. Stange Company Advertisements, convention special edition, *Meat: The Monthly Operating and Management Magazine for Meat Packers* (1938); and *National Provisioner* 101, no. 11 (October 14, 1939): 11.

<sup>45</sup> B. Heller Advertisement in *Butchers’ and Packers’ Tools*, McArthur Wirth: 78.

sausages.<sup>46</sup> After the enactment of the 1906 Federal Pure Food and Drug Act, Colorado similarly banned the coloring of meat products in 1907.<sup>47</sup> Around the same time, Minnesota and North Carolina prohibited the use of synthetic dyes in all foods.<sup>48</sup> As government began providing definitions of the “safety” and “naturalness” of foods, the “natural” color of foods became a complex characteristics of foods, created in a matrix of government regulation, technological innovation, and corporate interests.

### **The Enhancement of “Natural” Processes**

The creation of “natural” colors of fruits and vegetables involved the manipulation of natural ripening processes since their colors changed as they grew from immature to mature states. In the late nineteenth century, the long-distance shipment of agricultural produce required growers and packers to control the color as well as eating quality of their products. The development of refrigerated transportation and storage helped them to retard the spoilage of fresh produce. Yet to transport those highly perishable commodities effectively, agricultural growers, packers, and traders manipulated the color of their products by controlling harvesting seasons and by retarding and enhancing the plant’s biological growth. They usually harvested the produce while it was still green and stored it in coolers. Just before shipping to the

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<sup>46</sup> Laws of Wisconsin, *Joint Resolutions and Memorials*, Chapter 243 (1901), 328.

<sup>47</sup> William C. Breed, *Digest of State Food Laws* (New York: National Wholesale Grocers’ Association of the United States, 1907).

<sup>48</sup> Bernhard C. Hesse, “Coal Tar Colors Used in Food Products,” USDA, Bureau of Chemistry, Bulletin no. 147 (1912).



market, packers and wholesalers enhanced the products' color changes by promoting ripening processes.<sup>49</sup>

Until the early 1920s, many growers and packers had used combustion gases from kerosene lamps and gas stoves to ripen fruits and vegetables. In 1923, a USDA scientist determined the causal factor of the ripening process as ethylene gas, which was produced in the combustion of lamps and stoves. He showed that when a small amount of pure ethylene was released in the citrus fruit storage room, the fruit colored very rapidly.<sup>50</sup> During the 1920s and 1930s, ethylene became a common means for making oranges orange, apples red, bananas yellow, and tomatoes red.<sup>51</sup> Bananas in particular did not turn yellow, or ripen, on the tree. As soon as bananas were cut down, the fruit began to ripen and the skin color turned yellow. Picking the fruit triggered the

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<sup>49</sup> L. M. Dennis, *Gas Analysis* (New York: Macmillan, 1902); Arthur F. Sievers and Rodney H. True, "A Preliminary Study of the Forced Curing of Lemons as Practiced in California," USDA, Bureau of Plant Industry, Bulletin no. 232 (1912).

<sup>50</sup> Frank E. Denny, Method of coloring citrus fruits, US Patent 1,475,938, filed March 1, 1923, and issued December 4, 1923. See also Norwood C. Thornton, "The Facts about 'Artificially' Ripened Fruit," *Food Industries* 12, no. 7 (July 1940): 48.

<sup>51</sup> E. M. Chase and C. G. Church, "Effect of the Ethylene on the Composition and Color of Fruits," *Journal of Industrial and Engineering Chemistry (JIEC)* 19, no. 10 (October, 1927): 1135-39; E. M. Chase and F. E. Denny, "Use of Ethylene in the Coloring of Citrus Fruit," *JIEC* 16, no. 4 (April 1924): 339-40; F. E. Denny, "Hastening the Coloration of Lemons," *Journal of Agricultural Research* 27, no. 10 (March 1924): 757-69; E. F. Kohman, "Ethylene Treatment of Tomatoes," *JIEC* 23, no. 10 (October 1931): 1112-13; J. R. Winston, "The Coloring or Degreening of Mature Citrus Fruits with Ethylene," USDA Circular no. 961 (May 1955); and J. R. Winston and R. W. Tilden, "The Coloring of Mature Citrus Fruits with Ethylene Gas," USDA, Bureau of Plant Industry (September 1932).

release of ethylene from the banana, enhancing the ripening process.<sup>52</sup> Refrigerated transportation allowed green bananas to remain unripe until they reached auction sites or warehouses near the market.<sup>53</sup> Fruit jobbers hang bunches of bananas in a “ripening room” until the fruit turned to greenish yellow before shipping to retail stores.

Ethylene provided several advantages over the older way of coloring fruits and vegetables with stoves and kerosene lamps. The new method eliminated the necessity for long periods of heating, which often resulted in drying of the fruit. Gas and kerosene fumes tended to blacken the fruit rind and imparted an objectionable flavor. In addition, there was always a risk of fire in storage houses and in railroad cars from using lamps and stoves.<sup>54</sup> By treating with ethylene an entire carload could be ripened

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<sup>52</sup> Dan Koeppel, *Banana: The Fate of the Fruit That Changed the World* (New York: Hudson Street Press, 2008), 13.

<sup>53</sup> Waverley Root and Richard de Rochemont, *Eating in America: A History* (New York: William Morrow, 1976), 142, 153.

<sup>54</sup> E. M. Chace, “Health Problems Connected with the Ethylene Treatment of Fruits,” *American Journal of Public Health* 24, no. 11 (November 1934): 1152. Cooperative insurance companies usually did not permit kerosene stoves to be used in the packinghouse. Chase and Denny, “Use of Ethylene,” 340. See also William R. Barger and Lon A. Hawkins, “Coloring Citrus Fruits in Florida,” USDA Bulletin no. 1367 (May 1926); F. C. Blanck, W. S. Frisbie, and D. F. Fisher, “Report of the Committee on Citrus Coloration,” May 22, 1934, box 2002, Records of the Office of the Secretary of Agriculture, Record Group (RG) 16, National Archives, College Park, MD (NACP); Florida State Department of Agriculture (FSDA), *Citrus Industry of Florida* (Tallahassee, FL: Department of Agriculture, 1955), 183, 186; and Wilfred F. Wardowski, Steven Nagy, and William Grierson, *Fresh Citrus Fruits* (Westport, CT: AVI, 1986), 254.

uniformly, which eliminated nearly all the labor of sorting out damaged or green fruits.<sup>55</sup>

Even when ethylene was applied to fruits and vegetables, however, if they were harvested too early, they did not ripen properly or develop full color. When tomatoes were not mature enough, they colored poorly even after ethylene was poured over the produce. Immature persimmons did not develop the proper color or flavor, and immature avocados assumed an “unnatural” brassy color when treated with ethylene.<sup>56</sup> Produce was therefore left on the tree or vine until it reached what growers and packers called the “green-mature” stage: the product still looked green and was unfit for eating but mature enough to turn ripe with ethylene. The gas helped produce full color, increase the sugar content, decrease acidity, and improve general texture and flavor.<sup>57</sup>

Seeking to create uniform bright colors as the sign of succulent fruits and vegetables, growers and packers tended to prioritize the appearance of their produce over the actual taste. Several studies conducted in the 1920s and 1930s suggested that ethylene-ripened produce did not develop full flavor. While some scientists argued that ethylene-ripened products attained the same quality as those ripened on vines and

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<sup>55</sup> R. H. Hilgeman, “Ripening Fruit with Ethylene,” *Arizona Agriculturist* 5, no. 9 (June 1928): 4.

<sup>56</sup> “The Facts about ‘Artificially’ Ripened Fruit,” 51.

<sup>57</sup> J. T. Rosa, “Ripening of Tomatoes,” *Proceedings of the American Society for Horticultural Science* 22 (1925): 315; and Dean H. Rose, “The Effect of Ethylene on Color and Other Changes in Fruits and Vegetables,” USDA, Bureau of Plant Industry (July 1929). See also Kohman, “Ethylene Treatment of Tomatoes,” 1112-13; and E. V. Miller, “The Story of Ethylene,” *Scientific Monthly*, October 1947, 337.

trees, others insisted that artificially ripened fruits and vegetables generally had a lower sugar content than those ripened on the plant.<sup>58</sup> A 1925 study on tomatoes showed that “green mature” tomatoes, ripened by ethylene, remained solid for a longer period than vine-ripened fruits.<sup>59</sup> While the firm fruit was easy to transport, it did not give consumers the same flavor or texture as vine-ripened tomatoes. Uniform bright appearance, ease of transport, and longer storage became the primary concerns for agricultural producers and retailers to mass-produce fruits and vegetables and distribute them nationally.

The citrus industry was one of the first agricultural industries that employed ethylene extensively in the 1920s. Certain varieties grown in Florida matured without a change in skin color due to the warm climate. Usually, as the ripening process of oranges advances, the green color of the rind is bleached, allowing the orange color pigment to show up on the skin. These changes are enhanced when temperatures drop in the evening in autumn and winter. In Florida, at the opening of the orange shipping season in late September and October, when the temperature was still relatively high, the exterior color of oranges stayed green, while the inside of the fruit ripened. California citrus growers also faced a color problem because Valencia oranges, one of the major varieties grown in the state, sometimes returned to a greenish color after turning orange, if left on the tree in early summer.<sup>60</sup>

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<sup>58</sup> Hilgeman, “Ripening Fruit,” 4.

<sup>59</sup> Rosa, “Ripening of Tomatoes,” 320-21.

<sup>60</sup> Chase and Denny, “Use of Ethylene,” 339. See also H. Harold Hume, *Citrus Fruits*, rev. ed. (New York: Macmillan, 1957), 324-25.

Hence the color of citrus fruits was not always a reliable indicator of ripeness. According to a 1923 USDA report on the color of citrus fruits, when the eating quality of oranges fully developed and inside the fruit ripened, they were still entirely green in skin color. Shortly after the fruit became fully colored on the tree, it was insipid to the taste, indicating that it was over mature and past the marketing stage.<sup>61</sup> In a 1932 USDA Yearbook, the Agricultural Commissioner of the Bureau of Agricultural Economics contended that there was “no definite relation between flavor or maturity and the color of fruit while on the tree,” but there was “a very significant relation between the color of the fruit offered for sale and the price that it [would] bring.” By arguing that citrus fruit producers “always faced the problem of making the color of ripe fruit match its flavor,” he indicated that the treatment of oranges with ethylene gas was necessary to increase the consumption of citrus fruits.<sup>62</sup>

The enhancement of citrus color with ethylene was called the sweating, or de-greening, process. When the fruit arrived at the packing house, boxes of oranges were stacked in warm humid rooms, called “sweating rooms,” for forty-one to forty-eight hours.<sup>63</sup> The heat, humidity, and ethylene accelerated the coloring by bleaching out the

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<sup>61</sup> R. C. Wright, “Coloring Satsuma Oranges in Alabama,” USDA Bulletin no. 1159 (August 22, 1923). See also Blanck, Frisbie, and Fisher, “Report of the Committee;” E. M. Chase, “Sweating of Oranges,” *American Food Journal* 9, no. 8 (August, 1914): 491; and Chase and Denny, “Use of Ethylene,” 339.

<sup>62</sup> Paul O. Nyhus, “Citrus Fruit Coloring by Ethylene Process Much Improved Lately,” USDA Yearbook, 1932: 134.

<sup>63</sup> G. R. Williams to Sydney C. Chase, 21 October 1922, Chase Collection, Special and Area Studies Collections, George A. Smathers Libraries, University of Florida, Gainesville, FL.

green and unmasking the yellow and orange pigment.<sup>64</sup> In Florida, about two-thirds of the packinghouses used ethylene gas in the 1931-32 season, while most of the remainder still used kerosene.<sup>65</sup> In California, nearly half of oranges were treated with ethylene before their shipment.<sup>66</sup>

While ethylene offered a relatively satisfactory result, it did not always give oranges full mid-season color. Poor ventilation and high temperature also tended to cause rapid decay of the fruit.<sup>67</sup> In 1933, as an alternative to ethylene treatment, Rodney B. Harvey, a plant physiologist at the University of Minnesota, and Frank Schell, a Florida grove owner, patented a process for enhancing the color of oranges with synthetic dyes.<sup>68</sup> It was called the color-add, or Harvey, process. Oranges were immersed in a coloring solution for about five minutes, then passed through a pure water bath for rinsing, drying, polishing, grading, and packing.<sup>69</sup> The color-add process decreased treatment time significantly, to less than five minutes while

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<sup>64</sup> Blanck, Frisbie, and Fisher, "Report of the Committee." The room temperature was maintained at about 85°F and the humidity at about 85 percent. FSDA, *Citrus Industry of Florida*, 183.

<sup>65</sup> "A Study of the Cost of Handling Citrus Fruit from the Tree to the Car in Florida," University of Florida, Agricultural Experiment Station Bulletin no. 266 (April 1934).

<sup>66</sup> Paul S. Armstrong to D. F. Fisher, 26 April 1934, box 2002, RG 16, NACP.

<sup>67</sup> "Much Damage Done to Florida Citrus in Coloring Room," *Citrus Industry* 10, no. 4 (April, 1929).

<sup>68</sup> Rodney B. Harvey, Process of treating fruit, US Patent 1,909,860, filed February 24, 1933, and issued May 16, 1933.

<sup>69</sup> A. Mitchell Palmer and Seforde M. Stellwagen, Letter of Transmittal and Brief for Proponents, Before USDA and FDA, October 30, 1933. See also FSDA, *Citrus industry of Florida*, 189.

ethylene took two to three days. Lessening the time of heating fruit reduced decay and helped oranges “stand up longer in the hands of the dealer and consumer.”<sup>70</sup> The cost per box was more or less the same: about 3.5 cents per box for the color-add process and 3.3 cents for ethylene sweating.<sup>71</sup> With the same cost, faster treatment time, and more satisfactory results, the color-add process was an ideal solution for many orange growers and packers. The first carload of dyed oranges arrived in New York City from Florida in April 1934.<sup>72</sup> Colored oranges were also sent to other northern cities.<sup>73</sup>

Harvey and Schell sold the patent to the Food Machinery Corporation (FMC), a manufacturer of agricultural equipment headquartered in San Jose, California. By May 1934, the FMC had begun using the orange dyeing process at one plant each in California and in Florida.<sup>74</sup> In promoting the color-add process, the firm emphasized its efficiency: a “much more attractive color was provided” and the processing time would be reduced significantly.<sup>75</sup> Some cooperatives advertised color-added oranges with distinctive brand names, promoting them as higher quality than regular fruits. The San Diego Orange Growers Exchange, for instance, sold color-added oranges

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<sup>70</sup> “Harvey Processed Oranges,” *Chicago Packer*, May 5, 1934.

<sup>71</sup> Ibid.

<sup>72</sup> Ibid.

<sup>73</sup> “Philadelphia Street Notes,” *Chicago Packer*, June 16, 1934.

<sup>74</sup> “Harvey Processed Oranges.”

<sup>75</sup> Food Machinery Corporation (FMC) Advertisement, *Citrus Industry* 15, no. 9 (September 1934): 7. See also FMC Advertisement, *Citrus Industry* 16, no. 7 (July 1935): 21.

under the name “Epicure.”<sup>76</sup> In addition to California and Florida, citrus cooperatives in Texas soon followed suit.<sup>77</sup>

There was a strong belief within the citrus industry as well as among USDA scientists that color was a crucial factor in marketing oranges as well as other fruits. Florida orange growers and packers insisted that it would be impossible to market green color oranges, unless they could find “markets for green colored though fully matured fruit.”<sup>78</sup> Proclaiming the necessity of the dyeing practice in the mid-1930s, the chairman of the Florida Citrus Commission (FCC), a government agency in the Florida State Department of Citrus, argued that “since color plays so important a part in the sale of oranges, many crops must be colored artificially before they can be marketed at a profit for the grower.”<sup>79</sup> In 1934, a USDA scientist asserted that since consumers were “prone to judge the quality of fruits by the appearance,” “nicely

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<sup>76</sup> “Watch for the Juicetest Color Added U.S. No. 1 Oranges,” (FMC Advertisement), *Chicago Packer*, June 9, 1934.

<sup>77</sup> Polis & Hagan Advertisement, “Texas Citrus Color Added Oranges,” *Chicago Packer*, December 10, 1938.

<sup>78</sup> C. C. Commandor to D. F. Fisher, 3 April 1934, box 2002, RG 16, NACP. See also “Bright Fruit from the Marketing Viewpoint,” *Citrus Industry* 6, no. 4 (April 1925): 6; “Fruit Color Important Factor in Making Sales,” *Citrus Industry* 10, no. 12 (December 1929); and Harold Crows to C. C. Commandor, 16 September 1933, box 1830, RG 16, NACP.

<sup>79</sup> See also L. P. Kirkland, “The ‘Color Added’ Situation,” *Proceedings of the Florida State Horticultural Society (FSHS)* 49 (1936): 103-04. See also John R. Winston, “Harvesting and Handling Citrus Fruits in the Gulf States,” *USDA Farmers’ Bulletin* no. 1763 (February 1937): 2-3.



colored oranges, bananas or peaches which [were] attractive to the eye [would] sell better than an equal or even better quality of the same fruits not so well colored.”<sup>80</sup>

Soon after the FMC introduced the color-add process to California, however, the California Fruit Growers Exchange (CFGE) and other citrus cooperatives as well as state agricultural agencies began criticizing the process as food adulteration and deception of consumers, and asserted that using ethylene was satisfactory for California fruits.<sup>81</sup> The general manager of the CFGE argued that there was a clear distinction between the addition of a food color to orange skin and the acceleration of color latent within the orange by ethylene.<sup>82</sup> Although many producers believed that green colored oranges were not marketable, even when they were ripe inside, opponents of citrus dyeing did not consider the practice justifiable for efficient agricultural production and marketing. Facing opposition from California growers and packers, the FMC turned to Florida as a major marketing site for their citrus coloring

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<sup>80</sup> Chace, “Health Problems,” 1152. See also F. D. Richey to Paul H. Appleby, 5 July 1934, box 2002, RG16, NACP.

<sup>81</sup> Sheldon Hochheiser, “May We Dye Our Oranges: Technological Innovation Breeds Political Controversy in the Florida Citrus Industry, 1933-1937,” in *The History and Sociology of Technology: Proceedings of the Twenty-Fourth Annual Meeting of the Society for the History of Technology* (Milwaukee: Milwaukee Public Museum, 1982), 306; and R. G. Tugwell to Duncan U. Fletcher, 25 April 1934, box 2002, RG 16, NACP.

<sup>82</sup> Armstrong to Fisher. See also Karl D. Loos to K. A. Ryerson, 19 March 1934, box 2002, RG 16, NACP.

business.<sup>83</sup> Although some Florida growers rejected dyeing, an increasing number of packers began installing citrus-coloring machinery in the mid-1930s.<sup>84</sup>

The different attitudes toward citrus coloring in Florida and California were partly due to intense competition, between the two states as well as among Florida growers. California growers were much more organized than their Florida counterparts. A majority of growers were affiliated with the CFGE, which represented more than 80 percent of California citrus growers by 1930. Between 1927 and 1939, the exchange marketed more than three-quarters of all California citrus.<sup>85</sup> Affiliations of Florida growers and packers, on the other hand, were diverse, and a number of them did not belong to any organization at all. They generally relied on independent shippers, rather than large pooling organizations or packing houses.<sup>86</sup> The Florida Citrus Exchange (FCE), a marketing organization founded in 1909, never controlled a majority of the Florida orange shipment. In the 1910s, the FCE marketed about 40

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<sup>83</sup> Hochheiser, "May We Dye Our Oranges," 306.

<sup>84</sup> "Color Added Citrus Fruit to Court Test?" *Chicago Packer*, December 21, 1935; "Florida Notes," *Chicago Packer*, November 2, 1935; "Florida News Notes," *Chicago Packer*, October 19, 1935; "Florida News Notes," *Chicago Packer*, November 16, 1935; "Fosgate Company Adding to Its Packing Facilities," *Chicago Packer*, September 12, 1936. See also "Orange Growers and Shippers Warned by Wallace on Color," *Chicago Packer*, November 30, 1935.

<sup>85</sup> Ronald Tobey and Charles Wetherell, "The Citrus Industry and the Revolution of Corporate Capitalism in Southern California, 1887-1944," *Citriculture and Southern California*, *California History* 74, no. 1 (Spring 1995): 8.

<sup>86</sup> Elizabeth Hoffman and Gary D. Libecap, "Political Bargaining and Cartelization in the New Deal: Orange Marketing Orders," in *The Regulated Economy: A Historical Approach to Political Economy*, eds. Claudia Goldin and Gary D. Libecap (Chicago: University of Chicago Press, 1994), 210-11.

percent of the state's citrus, but by the 1940s, it handled only about 20 percent of Florida oranges.<sup>87</sup> In the early 1930s, the manager of the FCE lamented that no one organization had been "given by the growers sufficient power to enact proper laws or to enforce strict regulations."<sup>88</sup> Without a strong unifying organization, individual growers' diverse interests sometimes hindered them from cooperating with each other.

Secondly, environmental conditions and citrus cultivation patterns allowed the CFGE to unify California growers more effectively. Because oranges could be stored on the tree for two to three months due to California's relatively cool nights, the CFGE prorated harvests across growers, picking only a portion of each grower's crop at any time. The proration of oranges ensured that no grower would benefit or suffer from temporary price changes as each grower's fruit was sold throughout the season. In contrast, because of climate conditions and limited storage technologies, Florida oranges did not store well on the tree and had to be harvested quickly to avoid fruit drop and deterioration. Unlike California crops, fruits in Florida could not be harvested across the season to even growers' price expectations.<sup>89</sup> Florida growers

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<sup>87</sup> Florida Citrus Exchange, Annual Report of the Florida Citrus Exchange, 1943-44: 15; Martin M. Lagodna, "Greens, Grist and Guernseys: Development of the Florida State Agricultural Marketing System," *Florida Historical Quarterly* 53, no. 2 (October 1974): 153; and Harman Steen, *Coöperative Marketing: The Golden Rule in Agriculture* (Garden City, NY: Doubleday, Page, 1923), 38. See also Cleveland Bermuth Geer Rettig, "A Review of Marketing Florida Citrus" (masters' thesis, Florida Southern College, 1949): 14.

<sup>88</sup> J. Reed Curry to A. T. Gerrans, 19 August 1931, box 349, entry 1001, Records of the Food and Drug Administration, RG 88, NACP. See also "Citrus Industry Divided in Florida," *New York Times* (NYT), December 9, 1934.

<sup>89</sup> Hoffman and Libecap, "Political Bargaining," 208-209.

competed not only against the California citrus industry but also against their neighbors within the state.

Third, varietal differences grown in Florida and California intensified the competition between the two states. California produced mainly two varieties that did not compete with one another: winter navels with a season of October to June, and summer Valencias with a season from May through October. In Florida, there were at least five varieties that all ripened in the period between October and April. Florida oranges hence competed with each other and with California navels in the winter market, whereas California Valencias generally did not compete directly with any other oranges during early- to mid-summer.<sup>90</sup>

Moreover, the quality of California oranges was uniformly high because of favorable and consistent growing conditions while the quality of Florida produce varied widely depending on production sites. In California, most production (about 97 percent) was concentrated in counties within a ninety-mile radius of Los Angeles, where climate and soil quality were relatively similar. In Florida, orange production sites were spread over wider areas with varying soil, drainage, and weather conditions. Hence there were great differences in quality, orange type, and vulnerability to frost

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<sup>90</sup> Ibid., 195-96, 209; Sidney Hoos and J. N. Boles, "Oranges and Orange Product: Changing Economic Relationships," University of California, College of Agriculture, California Agricultural Experiment Station Bulletin no. 731 (1953): 26-27; and Agricultural Adjustment Administration, USDA, *Recent Changes in the Florida Citrus Industry: A Graphic Review of Certain Economic Factors Bearing on the Production and Marketing of Florida Oranges and Grapefruits* (Washington, D.C.: USDA, 1938), 36-37.

and wind damage among citrus fruits grown in the state; it was difficult for Florida growers to market uniform and high quality oranges.<sup>91</sup>

In facing intense competition against the California citrus industry and against their counterparts in Florida, less-organized Florida growers turned to a more convenient and economical way of enhancing citrus color by using synthetic dyes. Proponents of the color-add process held that the color manipulation of oranges was an “imperative necessity,” rather than a “desirability.”<sup>92</sup> They asserted that the process would serve as an effective solution to the problems of farmers’ low income, overproduction, and ineffective marketing by increasing the marketability of citrus fruits with more uniform coloration.<sup>93</sup> For agricultural producers, creating a more “natural” look of food products by an artificial means was a way to cope with environmental, political, and economic changes.

### **The Measurement of “Natural” Colors**

To make foods look “natural,” it was imperative for food producers to know what exactly “natural color” meant (or how it looked). In a 1941 issue of *Food Industries*, a food chemist advocated the importance of accurate measurement and determination of “right” food colors for food businesses:

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<sup>91</sup> Hoffman and Libecap, “Political Bargaining,” 208-209. See also Larry K. Jackson and Frederick S. Davies, *Citrus Growing in Florida*, 4th ed. (Gainesville, FL: University Press of Florida, 1999), 15-19.

<sup>92</sup> “Bright Fruit from the Marketing Viewpoint,” 6.

<sup>93</sup> Palmer and Stellwagen, Letter of Transmittal.

How green are canned green beans? How yellow is butter, or salad oil, or mayonnaise? How orange is an orange with “color added”? How white is white flour? In short, what has color to do with the food industry?<sup>94</sup>

These questions were not necessarily new in the early 1940s, as food scientists and producers had been conducting research on the measurement and manipulation of food color at least since the nineteenth century. Yet these inquiries epitomized new ways of seeing foods and understanding color that had emerged over the previous decades in the food industry. As discussed in the previous chapter, corporate marketing, government regulation, and print media helped create, define, and disseminate cultural expectations about the “right” and “natural” color of foods. By measuring and quantifying color, food manufacturers sought to translate the expectations to the actual appearance of their products.

The simplest method for color measurement was to compare the object with a standard by eye. In 1887, British brewer Joseph W. Lovibond developed an instrument, called a tintometer, for measuring the color of beer (Fig.18). An examiner placed a sample glass of beer on a tray and matched its color with one of the sixteen glass plates attached to the equipment. Each color slide was assigned a number beginning with the lightest as number one. By numbering each color, Lovibond aimed to eliminate ambiguity in the description of colors. Color names, such as dark brown and light yellow, did not have a clear standardized definition. “Dark brown” meant various degrees of darkness and different shades, depending on a viewer. The Lovibond tintometer provided a common language that color examiners and food

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<sup>94</sup> Gordon W. McBride, “How to Tell What Color It Is,” *Food Industries* 13, no. 9 (September 1941): 41.



Figure 18 Lovibond Tintometer, 1888. Division of Work & Labor, National Museum of American History, Smithsonian Institution.

manufacturers could share simply by using the number of each color plate. The tintometer was initially used primarily by the brewing industry. As the equipment became popular, Lovibond created similar scales for red, blue, and yellow that could be used for various food and beverage products.<sup>95</sup>

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<sup>95</sup> J. W. Lovibond, "The Tintometer – A New Instrument for the Analysis, Synthesis, Matching, and Measurement of Colour," *Journal of the Society of Dyers and Colourists* 3 (12) (December 1887): 186–193; Lovibond, "On a New Method of Colour Analysis by Means of the Tintometer," *Journal of the Society of Chemical Industry* 9, no. 1 (January 1890): 10-15; and Lovibond, "Relation of Colour to Value in Malt," *Journal of the Society of Chemical Industry* 16, no. 3 (March 1897): 188-93.

Color scientists developed color charts and dictionaries to establish standards. Food producers and researchers compared the colors of their finished products to the standards to determine whether the product attained the “right” color. One of the systems that was widely used (and is still used today) in the food industry was the Munsell system, originated by Albert H. Munsell, a professor of drawing at the Massachusetts Normal Art School in Boston, in 1905.<sup>96</sup> Munsell created what he called an “Atlas,” color charts that arranged different colors in order. Each color (or hue) was arranged based on the scale of value (the lightness or darkness of a color) and chroma (the saturation or brilliance of a color), and Munsell published color charts for 40 different hues.<sup>97</sup>

In 1930, color scientists Aloys John Maerz and Marshall Rea Paul published *The Maerz and Paul Dictionary of Color*. They developed color charts similar to Munsell’s Atlas, but Maerz and Paul covered a much wider range of hues: their *Dictionary* contained 7,056 colors – the largest number of colors in a color dictionary at the time. In setting color standards for canned fruits and vegetables, the USDA used the color charts of Maerz and Paul, primarily because their dictionary had the widest varieties of colors. One disadvantage, however, was that some of the neighboring

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See also R. W. G. Hunt and M. R. Pointer, *Measuring Color*, 4th ed. (Chichester, UK: Wiley, 2011), 190-91; Gordon Mackinney and Angela C. Little, *Color of Foods* (Westport, CT: AVI, 1962), 61-62; and Yeshajahu Pomeranz and Clifton E. Meloan, *Food Analysis: Theory and Practice*, 3rd ed. (Gaithersburg, MD: Aspen, 1994), 94.

<sup>96</sup> Hunt and Pointer, *Measuring Color*, 159.

<sup>97</sup> Dorothy Nickerson, “History of the Munsell Color System,” *Color Engineering* 7, no. 5 (September-October 1969); and Pomeranz and Meloan, *Food Analysis*, 92-93. For the development of the Munsell Color system, see Regina Lee Blaszczyk, *The Color Revolution* (Cambridge, MA: MIT Press, 2012), 45-70.



samples on the charts were so close that they appeared to be the same. Hence it was difficult for examiners to specify the color of the product based on the chart.<sup>98</sup>

Color charts and colorimeters provided examiners with a set of standards for investigating the “naturalness,” or “rightness,” of food colors and determining to what extent the color of the finished product deviated from the ideal standard or sample. But judging color with human eyes did not provide uniform or consistent results, since it depended on the physical and psychological conditions of the viewer, such as lighting, presentation of the sample, and the observer’s fatigue.<sup>99</sup> Until the 1930s, even though color scientists commonly understood the principles of color measurement and specification, there was no single widely accepted way to present the results of measurement. Nor were there standardized light sources for measuring colors, which was essential for accurate color measurement since the perception of colors depended on the reflection of lights. In 1931, the Commission Internationale de l’Éclairage (CIE; the International Commission on Illumination), an international organization for developing standards concerning light and color, adopted methods for the measurement and specification of color.<sup>100</sup> The CIE system allowed an examiner to

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<sup>98</sup> Dorothy Nickerson, “Color Measurement: And Its Application to the Grading of Agricultural Products,” USDA, *A Handbook on the Method of Disk Colorimetry* (March 1946): 2.

<sup>99</sup> See D. B. Judd, “Precision of Color Temperature Measurements under Various Observing Conditions: A New Color Comparator for Incandescent Lamps,” *Bureau of Standards Journal of Research* 5 (5) (November 1930): 11161-77; and Dorothy Nickerson, “Application of Color Measurement in the Grading of Agricultural Products,” USDA, Bureau of Agricultural Economics (January 1932).

<sup>100</sup> F. J. Francis and F. M. Clydesdale, *Food Colorimetry: Theory and Applications* (Westport, CT: AVI, 1975), 61; Dorothy Nickerson, “The Munsell Color Fan: Modern Color Science Is the Background for a New and Useful Color Chart for Horticulture,”

calculate and quantify colors by assigning values for the three primary colors (red, green, and blue).

Color scientists began experimenting with new equipment called spectrophotometers to replace human eyes for color investigation in the 1920s and 1930s. Since no two persons responded to a given light or color stimulus in quite the same way, there were discrepancies in research data among researchers. Spectrophotometers provided the quantitative measurement of color by calculating the intensity of light reflected from a sample of foods and beverages.<sup>101</sup> It was not until the mid- to late-twentieth century that colorimeters became fully automatic. Yet spectrophotometers and other colorimeters of the 1920s and 1930s allowed researchers to detect the color more uniformly and consistently than earlier equipment.

Color notation systems and measuring equipment provided scientists and food producers with “objective” knowledge about colors and a means for quantifying and standardizing the “naturalness” of food colors. As Jonathan Crary has shown in his study of the transformation of visual environments in nineteenth-century Europe, new ways of measuring and seeing colors developed in the early twentieth century were a technology imperative for “capitalist modernization” to “recode the activity of the eye,

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Proceedings of the Eleventh Annual American Horticultural Congress and Annual Meeting American Horticultural Council (October 1956). See also Dorothy Nickerson, “Color Systems Defined,” ISCC Newsletter No.156 (November-December 1961): 10.

<sup>101</sup> See Kenneth A. Evelyn, “A Stabilized Photoelectric Colorimeter with Light Filters,” *Journal of Biological Chemistry* 115, no. 1 (August 1936): 63-75; C. E. K. Mess, “The Measurement of Color,” *JIEC* 13, no. 8 (August 1921): 729; and R. B. Withrow, C. L. Shrewsbury, and H. R. Kraybill, “The Design of a Precision Photoelectric Colorimeter,” analytical edition, *JIEC* 8, no. 3 (May 1936): 214-19.

to regiment it, to heighten its productivity and to prevent its distraction.”<sup>102</sup> Color, like sight in general, was no longer a personal sensation; even human eyes were replaced by equipment. The apparatus for color analysis altered how people understood colors fundamentally, and the rationalized and standardized perception of color became essential for manufacturers to give foods a “natural” color consistently.

### **The Threshold of “Naturalness”**

As the use of synthetic dyes increased and food technology developed in the early twentieth century, what made foods “natural” and “artificial” became difficult to define. Food producers used dyes for a wide range of products, including such perishables as oranges, meat, and salmon, to give them a “natural” look.<sup>103</sup> Some food producers, government officials, scientists, and consumers began questioning the safety and legitimacy of employing dyes for foods, especially for fresh produce. Those who were against dyeing foods criticized the practice as “artificial” while they saw other color-controlling technology, such as ethylene gas, as “natural.” Yet the distinction between the natural and artificial was not straightforward. Whether using synthetic dyes, “natural” dyes derived from vegetables, or ethylene gas, the enhancement of “natural” food color required human manipulation.

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<sup>102</sup> Jonathan Crary, *Techniques of the Observer: On Vision and Modernity in the Nineteenth Century* (Cambridge, MA: MIT Press, 1992), 24.

<sup>103</sup> “Artificially Colored Salmon,” *American Food Journal* 13, no. 6 (June 1918): 319; “Coloring Smoked Fish,” *Grocers’ Magazine* 28, no. 12 (December 1914): 7; and Hesse, “Coal-Tar Colors,” 24.

Ingredients of coloring sources were one of the critical factors that regulators and producers utilized to judge the “naturalness” of margarine and butter shades. As the previous chapter discussed, state and federal legislators served to regulate how margarine should look on the market. The 1902 federal margarine act imposed a ten-cent tax on “artificially colored” margarine and two cents on a product “free from artificial coloration” that caused “it to look like butter of any shade of yellow.”<sup>104</sup> But the act did not specify what constituted “artificial coloration.” The definition of artificiality was left to the jurisdiction of the Commissioner of Internal Revenue, who was in charge of taxing and regulating margarine.<sup>105</sup> Margarine manufacturers manipulated the color of their products to give them what consumers considered a “natural” color while avoiding violations of the law.

The unclear definition of “natural” and “artificial” colors of margarine posed a problem for regulators. The “natural” color of margarine was not necessarily white because even without food colors it sometimes assumed a yellowish shade, rather than pale white, depending on its ingredients. Margarine producers followed their own understanding of “naturalness” and “artificiality” to provide yellow margarine and to evade the ten-cent tax. One solution was to use vegetable oils, such as coconut, palm, and sesame oils, which assumed a yellow shade due to carotenoid pigments in the

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<sup>104</sup> The previous federal margarine act, enacted in 1886, imposed a tax on all margarine regardless of its color; hence there was no distinction between “artificially colored” and “uncolored” products.

<sup>105</sup> “Yellow Oleomargarine,” *Dairy and Produce Review* 5, no. 20 (October 29, 1903): 1. See also “‘Uncolored’ Yellow Oleo-Margarine,” *Dairy and Produce Review* 5, no. 11 (August 27, 1903): 2.

fats.<sup>106</sup> Margarine manufacturers argued that they were not intentionally dying their products to look like butter, but that these vegetable oils were an essential ingredient of margarine; hence their margarine was “naturally” colored and not subject to the ten-cent tax imposed on “artificially colored” margarine.<sup>107</sup>

The Commissioner of Internal Revenue, however, questioned the use of vegetable oils. A few months after Congress passed the 1902 margarine act, the Commissioner contended that because “so minute and infinitesimal a quantity of a vegetable oil [was] used” in the manufacture of margarine, the oil would not be considered as “a bona fide constituent part or element of the product,” but it was used “solely for the purpose of producing or imparting a yellow color” to the margarine. Therefore, the Commissioner concluded, the margarine that contained vegetable oils would be considered as “not free from artificial coloration” and would become subject to the tax of ten cents per pound.<sup>108</sup> In 1909, the Supreme Court upheld the Commissioner’s opinion, ruling that the proportions of the vegetable oil used in margarine were so small that it substantially served only the function of coloring

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<sup>106</sup> Pabst, *Butter and Oleomargarine*; and M. K. Schwitzer, *Margarine and Other Food Fats: Their History, Production and Use* (London: Leonard Hills Books, 1956), 143.

<sup>107</sup> “A Fight on Colored Oleomargarine,” *Dairy and Creamery* 5, no. 9 (May 1, 1903): 7.

<sup>108</sup> “Commissioner Yerkes’ ‘Palm Oil’ Decision,” *National Provisioner* 27, no. 8 (August 23, 1902): 15. See also “Can’t Use Palm Oil,” *Chicago Livestock World*, August 15, 1902; “A Fight on Colored Oleomargarine,” *Dairy and Creamery* 5, no. 9 (May 1, 1903): 7; “In the Clutch of the Law,” *Dairy and Produce Review* 5, no. 1 (June 18, 1903): 1; “Oleomargarine Legislation,” *Dairy and Creamery* 3, no. 22 (November 15, 1901): 9; and “Palm Oil Oleomargarine,” *Dairy and Creamery*, 4, no. 17 (September 1, 1902): 9.

margarine so as to make the product look like butter. The oil hence was considered an “artificial coloration,” and the finished product would be subject to ten cent tax.<sup>109</sup>

After the Supreme Court decision, margarine manufacturers began experimenting with other vegetable oils, including cottonseed, peanut, and soy bean oils, which could be used in sufficient volume to constitute legitimate ingredients of the product.<sup>110</sup> Under the 1902 act, margarine was defined as a compound made of animal fat, such as tallow and suet; hence vegetable-oil products were not subject to the ten-cent taxation although manufacturers continued to sell these products as “margarine.” During the 1910s and 1920s, the production and sale of “uncolored” yellow butter substitutes rapidly increased. By the late 1920s, vegetable-oil compounds and combination of vegetable and animal oil products had displaced the all-animal-fat margarine.<sup>111</sup> Officials at the Bureau of Internal Revenue frequently

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<sup>109</sup> Moxley v. Hertz, 216 U.S. 344 (1910). See also “Oleo Case Is Lost,” *Chicago Livestock World*, February 22, 1910; and Snodgrass, *Margarine*, 66. For the Supreme Court cases concerning the color of margarine, see also Cliff v. United States, 195 U.S. 159 (1904); and McCray v. United States, 195 U.S. 27 (1904).

<sup>110</sup> Snodgrass, *Margarine*, 66. In the 1900s, the use of vegetable oils for margarine was accelerated by the commercial application of hydrogenation technology – a chemical process to harden liquid oils by adding hydrogen into fat at high pressure.

<sup>111</sup> Walter H. Eddy, “What Is Margarine Good For?” *Good Housekeeping*, April 1929, 97. See also National Cooperative Milk Producers Federation, “Oleomargarine and the Farmer” (March 1948). During the 1920s, coconut oil became a major ingredient, used in roughly half of the total margarine produced, because the oil was more plentiful and cheaper than beef fat. *Annual Report of the Commissioner of Internal Revenue* (Washington, DC: Government Printing Office, 1921), 118; Walter H. Eddy, “Something New in Foods,” *Good Housekeeping*, May 1931, 102; and Martha C. Howard, “The Margarine Industry in the United States: Its Development under Legislative Control” (PhD diss., Columbia University, 1951): 164, 213.

complained that it was impossible to regulate the manufacturing of margarine and enforce the law based upon the color standard.<sup>112</sup>

In the 1930s, the federal government closed the tax loophole of “naturally” colored butter substitutes. In 1930, Congress amended the federal margarine act so as to change the definition of “margarine” to include products made not only of animal fat but also of vegetable oils. All compounds “made to look like butter” became liable to margarine taxation. The following year, Congress passed the Brigham Act, which imposed a ten-cent tax on yellow margarine regardless of the source of its color. In addition, the act stipulated for the first time the definition of yellowness of butter and margarine, measured by a colorimeter to eliminate uncertainties.<sup>113</sup> By quantifying and standardizing color, legislators sought to establish the color of margarine as an “objective” indicator to regulate the product. After Congress enacted the Brigham Act, the amount of colored margarine decreased to less than 1 percent of the total production.<sup>114</sup>

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<sup>112</sup> Pabst, *Butter and Oleomargarine*. See also Ruth Dupré, “‘If It’s Yellow, It Must Be Butter’: Margarine Regulation in North America Since 1886,” *Journal of Economic History* 59, no. 2 (June, 1999): 355.

<sup>113</sup> The act provided that margarine shall be yellow when it had a shade containing more than “1.6 degrees of yellow, or of yellow and red collectively, as indicated by the colorimeter.” The 1.6 degrees was practically no color at all to the naked eye. Howard, “The Margarine Industry,” 272-74; “Margarine Regulations Amended to Conform with New Legislation,” *Oil and Fat Industries* (July 1931): 274-75; and Pabst, *Butter and Oleomargarine*. See also Sean F. Johnston, *A History of Light and Color Measurement: Science in the Shadow* (Philadelphia: Institute of Physics Publishing, 2001).

<sup>114</sup> Howard, “The Margarine Industry,” 75a, 208, 327a.

Under the 1931 Brigham Act, neither yellow nor white became the “natural” color of margarine. Margarine manufacturers continued to use vegetable oils, rather than beef fat, due to their availability and cheaper price. Because margarine with a yellow tint became subject to the ten-cent taxation, producers artificially bleached yellow shades, imparted by vegetable oils, to make the margarine white.<sup>115</sup> As margarine makers continued to supply color capsules for household use, consumers colored bleached-margarine with yellow dyes to serve it as a butter substitute on their tables. For most consumers, the “natural” color of margarine was still bright yellow. Due to government regulation, white margarine became an artificially created “natural” color.

Like the margarine coloration, the sources of food coloring complicated what constituted the “natural” color of butter. As public concern and government regulation of food safety became intensified in the early twentieth century, dairy producers increasingly utilized plant-derived “natural” dyes, especially annatto. Yet the naturalness of these butter coloring practices was questioned within the industry. Some butter makers and government officials believed that adding colors – whether synthetic or natural dyes – was not only unnecessary but also the deception of consumers. They asserted that good butter always attained good enough color at any time of the year and that consumers were not demanding highly colored butter.<sup>116</sup> One butter maker argued that “sensible people, [who would] pay twenty-five cents for good

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<sup>115</sup> Ibid., 177-78.

<sup>116</sup> Hazard, *Butter and Butter Making*, 12; “Should Butter Be Colored,” *Farmers Voice*, April 28, 1900; and “Coloring Butter,” *Wallace’s Farmer*, February 27, 1903.



butter” were well aware that butter was not as yellow in winter as in summer and they would be satisfied if the butter was otherwise good.<sup>117</sup>

Proponents of butter coloring, who constituted the majority of the dairy industry, criticized their counterparts harshly and declared that if the coloring of butter was abolished, there would be a great calamity to the industry, as the public would not purchase “an objectionable pale color” of butter.<sup>118</sup> For both opponents and proponents of butter coloring, the term “artificial coloring” meant the addition of coloring matter to butter. While the former group viewed artificiality as deception and adulteration, the latter considered it as an essential means to create the “natural” color of butter.

Nonetheless, those who opposed the use of dyes in butter still considered color an important factor in selling the product. In a 1906 farm newspaper *Wallace’s Farmer*, one dairyman introduced a way to retain “desirable” butter color without using dyes: oats mixed in cattle feeds gave butter a golden tint.<sup>119</sup> For these butter makers, as long as coloring matter, such as food dyes, was not added, the color of butter could be considered “natural.” Similarly, Harvey Wiley, a key figure in enacting the 1906 Pure Food and Drug Act, noted that during winter if carrots or yellow maize were added to cows’ feeds, butter would have an “attractive light amber tint,” which he considered the “natural tint of butter.” While stressing that feeding cows on yellow substances was a “natural” practice, Wiley bitterly objected to the addition of food

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<sup>117</sup> “The Farmer’s Point of View,” *Farmers Voice*, February 3, 1900.

<sup>118</sup> “Coloring Butter,” *Dairy and Produce Review* 3, no. 8 (August 7, 1902): 2.

<sup>119</sup> “Coloring Butter,” *Wallace’s Farmer*. See also “Use of Butter Color,” *Prairie Farmer*, July 12, 1906.

colors to butter as the deception of consumers. The “natural” color of butter was “much more attractive than the artificial as any natural color [was] superior to the artificial,” Wiley argued.<sup>120</sup> Dairy farmers had traditionally fed carrots and other yellow substances to cows to give butter a richer color, especially during winter. Like the addition of food dyes to butter, the practice of feeding carrots and yellow maize to cows also involved human manipulation and intentional control of color. For those opponents of the butter dyeing practice, the line between the natural and the artificial lay not only in the source of butter color but also in when the color was added – when feeding cattle or churning butter.

While the use of dyes was highly controversial in the food industry, most government officials, scientists, and food producers did not question the employment of ethylene gas for promoting color changes in fruits and vegetables. By the 1930s, ethylene had been widely used for various produce, including tomatoes, bananas, and oranges. While some citrus growers insisted that the gas deteriorated the eating quality of oranges, many agricultural producers, as well as government scientists, believed that ethylene treatment was necessary to produce and supply uniform quality and efficiently market agricultural products.<sup>121</sup>

In 1934, when the Food Machinery Corporation introduced the color-add process to Florida and California, the USDA appointed the Committee on Citrus

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<sup>120</sup> Harvey W. Wiley, *Foods and Their Adulteration: Origin, Manufacture, and Composition of Food Products; Infants’ and Invalids’ Foods; Detection of Common Adulterations* (Philadelphia: P. Blakiston’s Son, 1917), 185.

<sup>121</sup> Kohman, “Ethylene Treatment of Tomatoes,” 1112-13; D. F. Fisher to Henry A. Wallace, 22 May 1934, box 2002, RG 16, NACP; and Richey to Appleby.

Coloring to investigate the safety of the practice.<sup>122</sup> Most committee members objected to the citrus dyeing while claiming that the use of ethylene was legitimate. A USDA chemist argued that ethylene treatment merely unmasked “the characteristic colors already present” in the fruit and it was “entirely similar” to the process that occurred “more slowly in nature.”<sup>123</sup> Echoing the view that the use of ethylene was simply the enhancement of a “natural” process, other USDA scientists asserted that the term “coloring” used for the ethylene treatment was inappropriate. They contended that the word would convey “the erroneous impression of attempting to conceal inferiority,” when the use of the gas was “merely a stimulation of natural processes” by “blanching” rather than adding extraneous color.<sup>124</sup>

Despite the unfavorable report from the Committee on Citrus Coloring, the USDA and the Florida state government allowed the shipment of dyed oranges with the proviso that those oranges colored with synthetic dyes must have a stamp, “Color Added,” on the skins. In addition, under the state regulation, color-added oranges were required to meet higher maturity standards than the federal standards for uncolored oranges, to prevent growers and packers from using the method to conceal immaturity.

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<sup>122</sup> Fisher to Wallace. The Committee members included W.S. Frisbie (Food and Drug Administration), F.C. Blanck, (Bureau of Chemistry and Soils), and D.F. Fisher (Chairman, Bureau of Plant Industry). See Thornton, “The Facts about ‘Artificially’ Ripened Fruit,” 48.

<sup>123</sup> Richey to Appleby.

<sup>124</sup> Winston and Tilden, “The Coloring of Mature Citrus Fruits.” See also Winston, “Harvesting and Handling,” 2-3.

All fruits shipped from Florida became subject to rigid state inspection before being allowed to leave the state.<sup>125</sup>

To publicize the safety of the dyeing practice, Florida cooperatives distributed leaflets explaining that the dye used for coloring oranges was in no way harmful to consumers or detrimental to the quality of the fruit.<sup>126</sup> The Waverly Growers Cooperative printed a two-color placard to be enclosed in each box of color-added oranges:

The color used on “Color Added” oranges is an entirely harmless food color approved by state or federal certification to contain nothing injurious to health. Color added is a guarantee of quality. Oranges stamped “Color Added” are required by Florida law and rigorous inspection to meet higher standards of maturity and juice content than are required for any other orange by any other regulation, state or federal.<sup>127</sup>

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<sup>125</sup> The USDA maturity standard for oranges in all states was based on a so-called “8 to 1 test” (oranges needed to contain eight parts soluble solid to one part acid). In Florida, color-added oranges must pass the sweeter 9 to 1 state test. Colored fruits were also required to contain 4½ gallons of juice per standard box. Only color-added oranges were required to have this high juice requirement; others were not tested for juice at all. “Florida Orange Industry Pleased with Color Rule,” *Chicago Packer*, August 15, 1936; and R. D. Gerwe, “Citrus Red #2 Color for Oranges: Application for Listing and Approval,” Research report sponsored by American Cyanamid Company, August 1957, Florida Citrus Archives, Sarah D. and L. Kirk McKay, Jr. Archives Center, Roux Library, Florida Southern College, Lakeland, FL.

<sup>126</sup> Earl W. Brown, “The Value of Exhibits in Advertising Florida and Its Fruits,” *FSHS* 49 (1936): 81.

<sup>127</sup> “Waverly Growers Co-op. Explains ‘Color Added,’” *Chicago Packer*, December 14, 1935.

By stressing the higher quality standard for color-added oranges and the safety of citrus coloring, Florida growers and packers sought to make the color-add stamp as a guarantee of maturity.<sup>128</sup>

They soon recognized, however, that many consumers did not want dyed oranges and that “color added” stamps were detrimental to the sales of their fruits. In the mid-1930s, a member of the Florida Horticultural Society received letters from housewives who complained about color-added oranges. A woman in Knoxville, Tennessee sent a letter, attached with a piece of color-add labeled orange peel: “Since you Florida folk have become such gold diggers, I am for California oranges hereafter, when I can find them. What do you think you are doing to your lovely oranges anyway?”<sup>129</sup> Another woman gave up making marmalade after spotting “color add” stamps on “unbelievably bright oranges,” fearing that orange peel coated with dyes might be injurious to health.<sup>130</sup>

Some consumers considered the color-add practice as nothing but a deception of consumers because they strongly believed that green oranges, irrespective of inside quality, were immature. One woman wrote to the *New York Herald Tribune* after the paper had published an article that consumers should not “shy off from the orange

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<sup>128</sup> “R. B. Woolfolk Says Color Added Method Boon to Growers,” *Chicago Packer*, February 1, 1936. See also “‘Color Added’ Stamp a Mark of Superiority, L. P. Kirkland Declares,” *Chicago Packer*, August 15, 1936.

<sup>129</sup> Isabelle Thursday, “Developing the Home Market for Florida Citrus Fruits,” *FSHS* 49 (1936): 52.

<sup>130</sup> Ibid. See also USDA, “Consumer Acceptance of Florida Oranges with and without Color Added,” Marketing Research Report no. 537 (May 1962).

marked ‘color added’” as the color was harmless.<sup>131</sup> She wrote: “The color itself may be harmless but it fools the consumer. No orange can be called ripe until it reaches its full orange yellow on the tree. And, during that last period of final maturity, Mother Nature puts into the fruit those vital elements that give the orange its rightful place in the food scheme.”<sup>132</sup> Another letter sent from Florida asserted that no “Floridian with two grains of sense or appreciation of sweet tree-ripened fruit would touch a doctored orange or grapefruit. If Northerners could get to know what fine fruit we have, when it is honestly tree-ripened, they would have nothing more to do with ‘color-added’ oranges.”<sup>133</sup> Contrary to growers’ and packers’ hope that the term “color added” would become a sign of superiority, consumers saw the stamp adversely or did not know what “color added” actually meant.<sup>134</sup>

The labeling requirement reflected government officials’ and scientists’ understanding of what was natural and artificial, as well as industry interests in making marketable products. Facing strong objection from consumers, Florida growers contended that they should have the same right that “the butter people” were afforded.<sup>135</sup> State and federal governments permitted coloring butter with synthetic

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<sup>131</sup> Clementine Paddleford, “Growers Divided on Employing Color to Beautify the Orange,” *New York Herald Tribune*, January 20, 1940.

<sup>132</sup> Quoted in Paddleford, “Growers Divided,” 8. See also Thursday, “Developing the Home Market,” 49-54.

<sup>133</sup> Quoted in Paddleford, “Growers Divided,” 8.

<sup>134</sup> Mrs. Irving D. Datz to the USDA, 10 November 1942, box 157, RG 97, NACP.

<sup>135</sup> Sam H. Farabee, “The New Era in Citrus Cooperation,” *Lakeland Sunday Ledger*, May 17, 1936. See also “Problems of the Citrus-Fruit Industry” [hereafter “1948

dyes without a labeling requirement partly due to a strong dairy lobby. Nor did the USDA require citrus packers to declare the use of ethylene on labels, or orange skins, since the federal government did not see the ethylene treatment as artificial or adulteration. A “color-add” stamp was a product of political and business negotiations that helped define the artificiality of color manipulation.

Although the color-add process had become increasingly common in Florida by the 1940s, some growers and packers within the state strongly objected to the practice, believing that it was a harmful effect of agricultural mass-production and an intrusion into nature.<sup>136</sup> At the 1948 U.S. Senate hearings on the dyeing of oranges, a Florida grower, who had been one of the earliest growers to use orange dyeing equipment in the state, declared that he had come to believe that the practice deceived the consuming public. He protested that Florida growers “should get back to the old way of handling [their] fruit and not subjecting it to so many mechanical manufacturing ways of handling it.”<sup>137</sup> A “small fruit grower” from Florida also asserted: “when we interfere with nature, we are making a mistake. If I have to do part of the job that belongs to nature, I think I would make a serious mistake.”<sup>138</sup>

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Hearings”]: Hearings on S. Res., Before a Subcommittee of the Committee on Agriculture and Forestry, 80th Cong. 28 (1948) (statement of Marvin H. Walker).

<sup>136</sup> During the 1946-47 season, 21 million boxes out of 30 million boxes of oranges shipped fresh out of Florida were colored with synthetic dyes. “1948 Hearings,” 28 (statement of Walker); Paddleford, “Growers Divided,” 8.

<sup>137</sup> “1948 Hearings,” 300 (statement of R. D. Keene).

<sup>138</sup> *Ibid.*, 57 (statement of W. H. Cornett).

For opponents of synthetic colors, dyeing agricultural produce appeared to blur the line between the natural and artificial, and between “natural” products and processed foods – boundaries that many Americans were not willing to overstep, at least conceptually. Since agricultural production became highly industrialized in the early twentieth century, as historian Deborah Fitzgerald observed, “every farm [became] a factory.” “Science, technology, and the spirit of rationalism,” which had been principles for factory systems, represented by Fordism, became pervasive on American farms.<sup>139</sup> Citrus dyeing was one of many industrial, “efficient” practices, including chemical fertilizers, farm machines, and conveyor belt equipment, introduced to farmlands. At the same time, while mechanized processes were involved in the production, distribution, and marketing of agricultural products, colorful images of fruits and vegetables, often depicted in popular media, symbolized natural abundance.

### **Conclusion**

Making food look “natural” required human manipulation. What seemed “natural” was in fact created by “unnatural” practices and, at the same time, obscured the operation of artifice. Hence the environmental impact of producers and consumers was not always obvious. The increasing connections between agricultural producers and chemical companies in the early twentieth century represented the advent of new technologies and new level of manipulation that enabled producers to give foods a “natural” color. To what extent “artificiality” should be accepted and what

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<sup>139</sup> Fitzgerald, *Every Farm a Factory*, 8.



“naturalness” meant depended on producers’ economic interests, government officials’ understanding of food safety and public health, and consumer expectations about wholesomeness. Food producers sought to make their products look “natural” while reflecting cultural assumptions onto the appearance of the food.

The practice and regulation of coloring foods posed a question about who got to decide what “natural” meant. Government authorities, such as the USDA, sought to objectify naturalness and maturity by establishing standards and regulating certain products. Corporate capitalism or industrialized agri-business did not always succeed in manipulating consumer demands. While advertisements served to reinforce the popular perception of how certain foods should look, consumer expectations also affected how growers and packers harvested their produce and how wholesalers and retailers marketed the food. Dynamic relationships among culture, economy, and ecology created notions of naturalness and artificiality.

## Chapter 4

### CREATING “FRESH” COLORS IN FOOD STORES

“The antibiotics – like radiation – may cause some of us to change our minds about what we mean by ‘freshness,’” a scientist at the agricultural chemical firm American Cyanamid Company declared in a 1956 article, “How Science Makes Meat Less Perishable,” featured in the meat industry trade journal *National Provisioner*.<sup>1</sup> He insisted on the necessity of reckoning freshness not as an abstract term framed solely by time but as a particular state of foods based on bacteriology and chemistry:

When we speak of freshness, are we concerned with a fixed time concept in the handling of our food or is it a quality associated so often with a time relationship? Traditionally – for fish doesn’t freshness mean right out of the lake, stream or ocean? for poultry – right off the killing or eviscerating line? for red meats – to see the cuts made from the processed carcass right before our eyes? And what is the common denominator in all this? As few bacteria as possible in or on each of these commodities at the time we want to eat them.<sup>2</sup>

The author continued by emphasizing the commercial importance of antibiotics for the “maintenance of freshness,” particularly the preservation of the “bright animated color” of meat.<sup>3</sup> While the growth of bacteria – invisible to human eyes – was important for producers and retailers in defining the actual freshness of foods, he

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<sup>1</sup> “How Science Makes Meat Less Perishable,” *National Provisioner* 134, no. 21 (May 26, 1956): 139.

<sup>2</sup> Ibid.

<sup>3</sup> Ibid., 142.

suggested that the visible indication of color changes was significant for determining the marketability of perishable products.

Long before the development of bacteriology and the invention of refrigerators, (probably since the era of hunters and gatherers) people had identified color with the freshness of foods. By the 1950s, the transformation of food preservation technology and merchandising systems had altered the ways food producers, retailers, and consumers understood the color of freshness. By focusing on so-called “fresh foods,” specifically fruits, vegetables, and meat, this chapter examines how producers and retailers created and presented freshness in food stores from the 1920s to the 1950s, a time when self-service merchandising was becoming the dominant way of selling perishable items. The issue for retailers in selling produce and meat was that their quality deteriorated quickly. The color, as well as eating quality, of fruits and vegetables changed as they ripened. The color of meat started to change immediately after it was cut. Even though the brownish color did not necessarily mean spoilage, consumers considered this color change as the sign of deterioration.<sup>4</sup>

For much of the nineteenth century and the first decades of the twentieth, urban Americans bought food from public markets, local grocers, and peddlers, and picked produce from their own gardens.<sup>5</sup> A public market was often a space of sensory chaos. In 1884, a newspaper reporter quoted a “commission-man” at the South Water

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<sup>4</sup> Roger Horowitz, *Putting Meat on the American Table: Taste, Technology, Transformation* (Baltimore: Johns Hopkins University, 2006), 32-35.

<sup>5</sup> Tracey Deutsch, *Building a Housewife's Paradise: Gender, Politics, and American Grocery Stores in the Twentieth Century* (Chapel Hill: University of North Carolina Press, 2010), 13.

Market in Chicago describing the market as a “maze of barrels and boxes and gory calves, and chicken-coops, redolent with the unmistakable odor of the badly kept country barnyard and huge piles of sacked potatoes, and egg-cases, squashes, barrels of cider, and hogs cold and stiff in death.”<sup>6</sup> Shoppers saw and touched produce, smelled combinations of different foods (and non-foods), and heard people talking and horses neighing. In local grocery stores, on the other hand, consumers’ sensory access to goods was relatively limited: products were often displayed behind the counter or stored in a backroom. Moreover, these local grocers rarely carried perishable items.<sup>7</sup>

By the middle of the twentieth century, color, visual order, and cleanliness had become crucial factors for retailers to present the freshness of foods sold in self-service supermarkets. The emphasis on vision, as well as the elimination of disagreeable order, became essential for successful store operation. Retailers installed new display cases and store lighting and employed transparent films for wrapping meat and produce. The bright and clean ambience of the store accentuated the fresh appearance of perishable products.<sup>8</sup>

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<sup>6</sup> “The Marketing Problem,” *Chicago Tribune*, December 28, 1884. See also Deutsch, *Building*, 24.

<sup>7</sup> Deutsch, *Building*; James M. Mayo, *The American Grocery Store: The Business Evolution of an Architectural Space* (Westport, CT: Greenwood Press, 1993), 43-75; and Susan Strasser, *Satisfaction Guaranteed: The Making of the American Mass Market* (New York: Pantheon Books, 1989), 58-88.

<sup>8</sup> Deutsch, *Building*, 139-40. For discussion about sanitation and cleanliness in modern food stores, see also Lisa C. Tolbert, “The Aristocracy of the Market Basket: Self-Service Food Shopping in the New South,” in *Food Chains: From Farmyard to Shopping Cart*, eds. Warren Belasco and Roger Horowitz (Philadelphia: University of Pennsylvania Press, 2009), 183.

Self-service merchandising provided better visibility than counter-service retailing, but the visibility supermarkets created was carefully controlled by producers and retailers. Cellophane packaging enabled manufacturers to manipulate the appearance of products by preventing the discoloration of foods. It showed the insides of the package while shutting off consumers' access to the product through other senses. At supermarkets, where meat was already cut and produce packaged, and where consumers rarely had a chance to actually taste, smell, or touch packaged items, they needed to rely mostly on visual information in selecting foods. Compared to goods sold in grocery stores at the turn of the twentieth century, cellophane-wrapped products sold in self-service stores a few decades later seemingly provided consumers with better visual information about goods. Clear packages ostensibly showed consumers the "true" appearance of food and guaranteed freshness. Yet transparency did not necessarily mean that they could better understand food quality.

With the advent of new technology and scientific knowledge during the early- to mid-twentieth century, as the American Cyanamid Company's chemist suggested, freshness was no longer defined only by the passage of time. Represented by the color of produce and meat, freshness became what geographer Susanne Freidberg has called "industrial freshness," engineered by producers, distributors, and retailers and presented in sanitized and standardized stores.<sup>9</sup> She argues that producers' quest for manipulating fresh foods and consumers' demand for freshness "lies in the anxieties and dilemmas borne of industrial capitalism and the culture of mass consumption."<sup>10</sup>

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<sup>9</sup> Susanne Freidberg, *Fresh: A Perishable History* (Cambridge, MA: Belknap Press of Harvard University Press, 2009), 2.

<sup>10</sup> *Ibid.*, 3.

As the market became distant from food producing sites, modern technologies, or what Leo Marx called “the machine in the garden,” transformed agricultural production and the landscape in the American countryside, while urban consumers yearned for the “garden” in the city, specifically in the supermarket.<sup>11</sup> Consumers’ longing for “fresh,” “natural” foods in a bright, clean store required retailers to prolong the shelf-life of perishable products and to display them in a visually attractive manner.

“Supermarket” is an elusive term. Retailers, as well as scholars, have used it differently, and its definition has changed over time. In the early 1930s, the Supermarket Institute, one of the largest trade organizations for food retailers, originally defined a “supermarket” as a food outlet with minimum annual sales of \$250,000. The stores sold various items, including groceries, produce, and meats, and the grocery department had to be on a self-service basis under the definition.<sup>12</sup> In 1951, this definition was revised and the minimum volume for a supermarket was raised to \$500,000 annually. In 1955, the minimum volume was raised to \$1 million.<sup>13</sup> Today, the Food Marketing Institute (the successor of the Supermarket Institute) defines the term as a store offering a full line of groceries, meat, and produce with at least \$2 million in annual sales. In this chapter, as I focus mainly on the time period

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<sup>11</sup> Leo Marx, *The Machine in the Garden: Technology and the Pastoral Ideal in America* (New York: Oxford University Press, 1964).

<sup>12</sup> Mayo, *The American Grocery Store*, 117.

<sup>13</sup> Edward A. Brand, *Modern Supermarket Operation* (New York: Fairchild, 1963), 3. One of the leading grocery trade journals, *Progressive Grocer*, defines a supermarket as any food store, chain or independent, doing \$375,000 or more per year.

between the 1930s and 1950s, I follow the Supermarket Institute's first two definitions: stores selling various food items, including meat, produce, and self-serve groceries, with minimum annual sales of \$250,000, and \$500,000 after 1951.

### **The “Showcase” of the Supermarket**

Beginning in the 1920s, the consolidation of grocery businesses and the emergence of supermarkets altered not only food merchandising systems and purchasing patterns but also the visuality of food stores. Until then, although grocery stores had sold some perishable foods, their major food trade had been in canned and other processed products. Most butchers and produce grocers had traditionally operated specialized businesses in separate stores. In the 1920s, large independent grocers and chain stores began absorbing neighboring butcher shops and produce stores into their premises. In those “combined” stores that sold groceries as well as perishable foods, customers saved time by shopping for various food items at one store rather than at three different places.<sup>14</sup> Among the major five departments in a supermarket – produce, meats, groceries, bakery, and dairy – the grocery department usually accounted for about half of the total store sales, generating the largest profit margin of the store. The contribution of produce and meat departments to store sales

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<sup>14</sup> Arie Goldman, “Stages in the Development of the Supermarket,” *Journal of Retailing* 51 (4) (Winter 1975-1976): 57; and Mayo, *The American Grocery Store*, 134.

was relatively small: produce sales ranged from 8 to 20 percent, and meat department sales were approximately 25 to 30 percent of total store sales.<sup>15</sup>

Nevertheless, newly converted meat and produce sections became the “showcase” of the store because of their colorful “natural beauty” and the possibilities for attractive display.<sup>16</sup> During the 1920s and 1930s, grocery manuals and trade journals repeatedly stressed the importance of fresh produce for supermarket businesses by claiming that perishable items made its “greatest single appeal to the consumer through the eye.”<sup>17</sup> A 1935 *Progressive Grocer* noted that no commodities “[lent] themselves more naturally to inviting, appetizing arrangements than do fresh fruits and vegetables.”<sup>18</sup> In 1937, another article asserted that a “bountiful variety of fresh fruits and vegetables attractively displayed in all of nature’s color and freshness” drew consumers into the store.<sup>19</sup> “Unusual freshness or superior appearance of products” could even justify relatively higher pricing than other stores.<sup>20</sup> Grocers believed that the appearance of displays was the most important factor in the moving

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<sup>15</sup> Brand, *Modern Supermarket*, 27, 29, 42; and Nelson A. Miller and Harvey W. Huegy, “Establishing and Operating a Grocery Store,” U.S. Department of Commerce, Bureau of Foreign and Domestic Commerce, Industrial Series no. 21 (1946): 226.

<sup>16</sup> Brand, *Modern Supermarket*, 43.

<sup>17</sup> “Trim Them Properly,” *Progressive Grocer* 14, no. 2 (February 1935): 18.

<sup>18</sup> “Give Produce Display Appetite Appeal,” *Progressive Grocer* 14, no. 9 (September 1935): 44.

<sup>19</sup> “Fruits and Vegetables Offer Best Chance to Draw Shoppers,” *Progressive Grocer* 16, no. 1 (January 1937): 38-39.

<sup>20</sup> Miller and Huegy, “Establishing and Operating,” 227.



of stocks of fruits and vegetables, and that the attractive display of agricultural produce influenced the ambience of the entire store. They hence arranged the produce section in the “best position” in the store – usually near the entrance.<sup>21</sup>

The color of produce and meat was important for grocery operation not only because they brightened up store interiors and attracted consumers, but also because their colors were critical factors that determined whether a customer would accept a particular item. A 1937 article in the *Progressive Grocer* proclaimed that “she buys meat with her eyes,” noting that the majority of female customers decided which cuts of meat they would purchase *after* seeing the meat display. “She wants to see what she buys, and she buys what she sees,” the article contended.<sup>22</sup> The color of agricultural produce also influenced consumers’ purchasing decisions, as an indicator of the quality of a particular fruit and vegetable.<sup>23</sup>

The integration of perishable items into supermarkets provided retailers an opportunity to appeal to consumers by demonstrating the quality of the entire store, helping build customer loyalty. Because consumers purchased perishable products

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<sup>21</sup> Carl W. Dipman, Robert W. Mueller, and Ralph E. Head, eds., *Self-Service Food Stores* (New York: Progressive Grocer, 1946), 54; and Henry Frommes, “The ‘Eye Appeal’ in Selling,” *Meat Merchandising* 5, no. 12 (January 1930): 24. See also “Calls Color Secret of Fruit Display,” *Progressive Grocer* 16, no. 1 (January 1937): 135.

<sup>22</sup> Craig Davidson and Hugo B. Snider, “She Buys Meat with Her Eyes,” *Progressive Grocer* 16, no. 5 (May 1937): 32-33. See also Horowitz, *Putting Meat*, 33-35; Jerry Lee Mautz, “A Discussion of the History and Development of the In-Store Merchandising and Packaging of Fresh Red Meat with Emphasis on the Effect of Polyvinyl Chloride Film on a Traditional Cellophane Market” (masters’ thesis, Michigan State University, 1966): 25; and Gordon L. Robertson, *Food Packaging: Principles and Practice* (New York: Marcel Dekker, 1993), 433.

<sup>23</sup> Frommes, “The ‘Eye Appeal’ in Selling,” 24.

more often than packaged foods, if a grocer offered a good assortment of high quality fruits, vegetables, and meat, they would visit the store rather than other stores.<sup>24</sup> Since consumers, mainly housewives, generally thought first about the main dish – usually meat – in planning a meal, the meat department influenced their purchases of other groceries and perishables. As meat was also the most expensive single item, purchasers were more careful about selecting the product than other foods.<sup>25</sup> Moreover, most grocery items, such as canned foods, boxed cereals, and bottled goods, were identical wherever they were sold. The only advantage one store might have over another was favorable price and greater selection of these products. On the other hand, the available perishable items changed from season to season and sometimes from day to day, and variety was a source of interest to housewives.<sup>26</sup> Produce and meat departments allowed retailers to create the store's individuality and a favorable store image, to distinguish themselves from their competitors.

Because the bright appearance of produce and meat was essential for inviting store displays, the technology for maintaining the bright colors of perishable foods posed a critical problem to grocery businesses, preventing them from establishing a key feature of modern supermarkets – self-service merchandising – in those departments.<sup>27</sup> Until the mid-1940s, refrigerated display cases did not keep the

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<sup>24</sup> Miller and Huegy, "Establishing and Operating," 228.

<sup>25</sup> Brand, *Modern Supermarket*, 27, 42.

<sup>26</sup> M. M. Zimmerman, *The Super Market: A Revolution in Distribution* (New York: McGraw-Hill, 1955), 221.

<sup>27</sup> Mayo, *The American Grocery Store*, 159.

temperature of meat and produce low enough to prolong their shelf-life effectively.<sup>28</sup>

Nor were there adequate packaging materials for self-service retailing.

The development of the first self-service store is attributed to Clarence Saunders's Piggly Wiggly stores, opened in 1917 in Memphis, Tennessee. During the 1920s and 1930s, an increasing number of grocers began converting to self-service retailing. Yet self-service was initially applied only to non-perishable packaged foods. In most supermarkets, buying meat was much like shopping in a traditional butcher shop, with a full-service counter staffed by male butchers and sales personnel.<sup>29</sup> Shoppers lined up in front of the service counter and asked for the specific cut and the weight they wanted to purchase. During the transaction, customers had the opportunity to ask butchers which meat was fresh and whether it should be broiled or fried. The butcher retrieved the desired slab, cut the quantity ordered from the slab, and wrapped it. In purchasing produce, customers selected products from the bulk displays of fruits and vegetables, and store clerks working in the produce section weighed and bagged the items, then prices were confirmed by scale at the checkout counter.<sup>30</sup>

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<sup>28</sup> Jonathan Rees, *Refrigeration Nation: A History of Ice, Appliances, and Enterprise in America* (Baltimore: Johns Hopkins University Press, 2013), 117-18. See also "Prepackaging, Refrigerated Displays Cut Produce Spoilage Losses to 1½% of Sales," *Progressive Grocer* 33, no. 1 (January 1954): 46-47; and George E. Kline, "How to Merchandise Prepackaged Produce for Better Sales," *Progressive Grocer* 33, no. 9 (September 1954): 60.

<sup>29</sup> A. M. Pearson, "Factors Indicative of Quality in Beef and Their Measurements" in *Beef for Tomorrow: Proceedings of a Conference*, eds. E. R. Kiehl and Roland M. Bethke (Washington, D.C.: National Academy of Science, National Research Council, 1960), 37.

<sup>30</sup> Deutsch, *Building*, 69; Mayo, *The American Grocery Store*, 159; and "Produce Self-Service Successful," *Progressive Grocer* 24, no. 8 (August 1945): 140.

One of the problems that food dealers faced was the discoloration of meat once packed for self-service.<sup>31</sup> Meat packers and food retailers described the scarlet red color of meat as “bloom,” which consumers generally considered as a sign of good, fresh meat. But this “fresh” red color did not actually indicate that the meat was the “freshest” in terms of the time it was exposed to the air. Immediately after beef was cut, the meat assumed a purplish-red hue. After the meat was exposed to the air for 15 to 30 minutes, this coloration was replaced by a characteristic bright red color of “fresh” meat. When the supply of oxygen was cut off, red meat lost the bloom and assumed brown shades. Brownish meat was not necessarily a sign of spoilage although the color could suggest the deterioration of the product due to bacterial growth.<sup>32</sup>

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<sup>31</sup> A. T. Edinger, “Prepackaged Meat Sells Itself,” U.S. Department of Agriculture (USDA), Production and Marketing Administration, *Marketing Activities* 13, no. 1 (January 1950): 6; “Here Are Facts on Color Changes,” *National Provisioner* 143, no. 27 (December 31, 1960); Mautz, “A Discussion,” 25; Pearson, “Factors Indicative,” 37; and Robertson, *Food Packaging*, 433.

<sup>32</sup> The color of cut meat depends chiefly on the relative amounts of three pigments on the meat surface: “reduced myoglobin,” “oxymyoglobin,” and “metmyoglobin.” In uncut beef, myoglobin exists as a purple-red compound, “reduced myoglobin,” which has a great affinity for oxygen. When meat is first cut, because reduced myoglobin predominates on the surface, meat looks purplish red. After the meat is exposed to the air for 15 to 30 minutes (depending on temperature), oxygen is added to reduced myoglobin, which turns a scarlet-red pigment, called oxymyoglobin. The amount of oxymyoglobin determines the intensity of meat color, ranging from a bright red for beef to a delicate pink for veal and pork. When the supply of oxygen is cut off, oxymyoglobin becomes a brown substance, “metmyoglobin.” A. H. Landrock and G. A. Wallace, “Discoloration of Fresh Red Meat and Its Relationship to Film Oxygen Permeability,” *Food Technology* 9, no. 4 (April 1955): 194; G. C. Lavers, “Discoloration of Packaged Red Meat,” *Modern Packaging* (January 1948); Mautz, “A Discussion,” 27-28; “Oxygen Control Key to Fresh Meat Color,” *National Provisioner* 132, no. 7 (February 12, 1955); and “Problems in Packaging Meat Products,” *National Provisioner* 114, no. 16 (April 20, 1946): 76A.

A number of factors affected the rate at which the bloom was lost, including temperature, bacteria, and oxygen availability. Light intensity, type of wrap, and the variety of the meat also determined how fast the product discolored. It was hence extremely difficult for meat packers and retailers to predict the exact color effect of any particular treatment on a piece of meat.<sup>33</sup> Among these variables, temperature and oxygen were critical factors in maintaining bloom. High storage temperature accelerated the color change from red to brown on the surface of meat.<sup>34</sup> According to one experiment conducted in the mid-1950s, the red color of beef steaks could be kept up to seven days at 28°F, but held only one day at a temperature of 50°F.<sup>35</sup> The growth of bacteria, which caused the discoloration of meat, also depended on temperature. Strict controls on both refrigeration and sanitation were hence essential to retard bacteria growth in cut meats and prolong bright red color.<sup>36</sup>

Although supermarket managers showed tremendous interest in self-service retailing of perishable items, particularly meats, only a few stores tried running meat departments on a self-service basis before the 1940s.<sup>37</sup> The H. B. Bohack Company of

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<sup>33</sup> David A. Fellers, "'Pair Testing' Compares How Films Maintain Color of Fresh Meat," *Package Engineering* 10, no. 6 (June 1965): 92; and Robertson, *Food Packaging*, 435.

<sup>34</sup> Robertson, *Food Packaging*, 437.

<sup>35</sup> "Oxygen Control." See also C. B. Thor and F. Warren Tauber, "New Ideas on Developing Packaging Films for Cured and Fresh Meats," *National Provisioner* 133, no. 11 (November 10, 1955): 23, 25-26.

<sup>36</sup> Mautz, "A Discussion," 30-32; and Robertson, *Food Packaging*, 438.

<sup>37</sup> See "Self-Service for Meat Uncorks Super-Market Bottleneck," *Meat Merchandising* 17, no. 9 (September 1941): 24; and "Self-Serve Meats," *Meat Merchandising* 18, no. 5 (May 1942): 66.

New York experimented with self-service in its fifty stores in 1927. Its experiment failed, however. These stores lacked adequate refrigerated display cases and sufficient display space. The wrapping materials then available were not satisfactory for self-serve meat: they did not maintain the color and were not transparent – the feature that most retailers considered essential for self-service. In addition, most consumers had yet to become acquainted with self-service shopping in general.<sup>38</sup> California-based Espandola tried self-serve meat in the 1930s. The store's butchers cut meats and wrapped them in opaque butcher paper in advance. After weighing the package and designating its price, the meat was placed in a self-service refrigerated dairy case. Although the packages were accessible, customers could not see the meat, and the sales of the self-serve meat were not satisfactory to the store. During the 1930s, other food retailers experimented but soon gave up their self-service meat operation.

### **“The Eye Says Buy”: Displaying “Freshness”**

#### *Color Contrast and Mass Display*

As food retailers increasingly converted produce and meat sections into their stores during the 1920s and 1930s, the display of carefully selected fruits, vegetables, and meats in clean departments became a sign of the freshness of these items. Mass display and color contrast were the keys to the attractive arrangement of produce. A 1931 grocers manual claimed that because the beautiful colors of fresh produce afforded “great possibilities for attractive and appetite-provoking effects,” “produce

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<sup>38</sup> Brand, *Modern Supermarket*, 32.

items should always be arranged for color contrast” and that the entire store should “carry out a well-planned harmonious color scheme.”<sup>39</sup> A 1935 *Progressive Grocer* article gave grocers advice on how to create color contrast for produce display:

Place alternate rows of reds, whites, greens and yellows. Make narrow alternating bands or piles of red radishes, lettuce, carrots, spinach and celery, etc. that will give the appearance of so many colored ribbons. Arrange your fruits the same way, alternating masses of oranges, grapefruit, apples, lemons, tangerines and pears so that the contrasting colors will catch the shopper’s eye.<sup>40</sup>

Not only did color contrast make the display colorful and orderly-looking, but it also served to distinguish varieties of produce. Shoppers could easily spot, for instance, red radishes, when displayed next to green vegetables. The brightness and colorful arrangement of each kind of produce that stood out in the display helped provide the entire department with a fresh and bright appearance.

To make color contrast effective, grocers displayed produce in quantity. Display racks and tables full of colorful fruits and vegetables conveyed the impression of great variety, high quality, and abundance. The mass display of seasonal items for “peak effects,” such as large displays of oranges, peaches, berries, or melons in season, drew consumers’ attention for the department, as well as for the entire store.<sup>41</sup> One grocer asserted that when each different item was shown “in mass arrangement

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<sup>39</sup> Carl W. Dipman, ed., *The Modern Grocery Store* (New York: The Progressive Grocer, 1931), 165. See also “Artistic – but Easy,” *Progressive Grocer* 15, no. 9 (September 1936): 23; and Frommes, “The ‘Eye Appeal’ in Selling,” 24-27.

<sup>40</sup> “Give Produce Display Appetite Appeal,” 44.

<sup>41</sup> Ralph E. Head, “The Power of Produce,” *Progressive Grocer* 20, no. 6 (June 1941): 41, 43.

with special consideration for freshness and color contrast,” customers could not “resist buying liberally.”<sup>42</sup> Radishes, washed scrupulously, were piled with heads outward, in a high symmetrical mound next to a larger mound of potatoes with round ends exposed. Asparagus was shown in stepped up masses, next to a mound of cauliflower whose snowy whiteness was accented by filling out corners with bunches of red radishes.<sup>43</sup> A pile of colorfully arranged produce stood out in a store as a symbol of freshness and natural abundance.

Color contrast was important also for meat display. Grocers often used green garnishings and display dividers to add vivid color contrast to the meat cases. Meat retailers had commonly used fresh parsley and other green vegetables until the late 1930s, when they began using rubber-made green dividers (so-called “rubber greens”).<sup>44</sup> Garnishing manufacturers promoted their products by stressing the importance of color contrast and the close connections between eye appeal and sales appeal. In a 1931 advertisement, a display parsley maker asserted that “SALES are made through the EYE”:

Everything the EYE takes in forms the foundation of the sale. People buy what they SEE – the EYE makes up the mind. Meat displayed in

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<sup>42</sup> “Produce Needs Eye Appeal to Sell,” *Progressive Grocer* 17, no. 11 (November 1938): 78.

<sup>43</sup> See “Artistic – but Easy”; “Give Produce Display Appetite Appeal”; Head, “The Power of Produce”; and “Produce Needs Eye Appeal.”

<sup>44</sup> John P. Gleason, Display device, US Patent 1,898,769, filed June 6, 1932, and issued February 21, 1933; John P. Gleason, Display device, US Patent 2,095,564, filed April 20, 1935, and issued October 12, 1937; and Lynn H. McClintock, Decorative article, US Patent 1,929,366, filed February 7, 1933, and issued October 3, 1933.



your Refrigerated Display Case needs a sprightly note of Spring Green Color to give it added “EYE-APPEAL” [emphasis in the original].<sup>45</sup>

The firm suggested that the “Spring Green Color” of fresh parsley created visually appealing color contrast and accentuated the freshness of red meat color. Even when dividers were not made of *fresh* parsley, grocers believed that rubber greens juxtaposed to red and pink meats created “a look of freshness” and a “sparkling appearance.”<sup>46</sup> Garnishings “beautifully colored in deep forest green” made the “meat displays sparkle with natural freshness,” a rubber green manufacturer advertised in a 1948 *Progressive Grocer*, stressing the importance of visualizing freshness through colors. The company claimed that “the eye says buy” if grocers used its product.<sup>47</sup> In addition to the red-green color contrast, the arrangement of various meats from the whitish pink of veal to the bright cherry red of beef not only made the entire display look brighter and balanced but also helped consumers tell the differences between various cuts of meat.<sup>48</sup>

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<sup>45</sup> Alsteel Products Company Advertisement, *Meat Merchandising* 6, no. 12 (January 1931): 21. See also Craig Davidson and F. O. Britton, *How to Make Money Selling Meat* (New York: Progressive Grocer, 1938), 30; and “Use Greens to Increase Eye Appeal,” *Progressive Grocer* 17, no. 2 (1938 February): 31.

<sup>46</sup> “A Successful Super Market,” *Meat Merchandising* 22, no. 8 (August 1946): 86; and “Rubber Greens Give Color Contrast to Meats,” *Meat Merchandising* 22, no. 3 (March 1946): 53. See also “How to Build Meat Displays That Sell,” *Progressive Grocer* 27, no. 4 (April 1948): 90-92.

<sup>47</sup> Shaw & Slavsky Inc., Advertisement, *Progressive Grocer* 27, no. 3 (March 1948): 49. See also “How to Build Meat Displays,” 90-92.

<sup>48</sup> “These Pointers on Meat Display Will Help You Sell More Meat,” *Meat Merchandising* 17, no. 3 (March 1941): 20.

Equipment manufacturers introduced new display cases, equipped with mirrors, in the 1940s, enabling grocers to create color contrast and mass-display of perishable items more effectively than before. A tilted long mirror set along the top of the produce display case reflected the fruits and vegetables and the meat products below, giving the “illusion of a much larger stock.”<sup>49</sup> The mirror also helped enhance “eye-appealing color contrasts.”<sup>50</sup> Mirrors hung over the produce and meat departments at the proper angle reflected light on the products, making them look much brighter and more attractive. The proper placing of a mirror was very important. The angle at which the mirror was to be suspended depended on the width of the department and on the height the mirror was from the floor. The angle of the mirror needed to be adjusted so as to reflect the most light on the produce and to show all the produce on display to customers standing a short distance away.<sup>51</sup>

In creating and presenting a “fresh look” for perishable foods, retailers taught how “fresh” produce and meat should look, particularly to urban consumers who had never seen or eaten *freshly* harvested produce. The construction of freshness in modern food stores required the elimination of unattractive appearances and objectionable odors. “Smelly, messy, unsanitary-appearing” products, such as the odor

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<sup>49</sup> “Green Lights Enhance Produce,” *Progressive Grocer* 20, no. 9 (September 1941): 88.

<sup>50</sup> “Sales-Tempting Produce Dept.,” *Progressive Grocer* 20, no. 7 (July 1941): 216.

<sup>51</sup> “Mirrors over Produce Section Beautify Display and Pull More Sales,” *Progressive Grocer* 20, no. 5 (May 1941): 73-74. See also “Small-Town Store Can Be Good Too – Look This One Over,” *Progressive Grocer* 24, no. 10 (October 1945): 88.

of meat and fish, should be destroyed, a 1939 *Progressive Grocer* article declared.<sup>52</sup> To heighten the attractiveness of produce and meat displays, grocers segregated unattractive items from the regular department and sold at reduced prices. A few heads of lettuce with wilted leaves, or a stalk of celery with dried ends, could spoil the entire department.<sup>53</sup> To give a fresh appetizing appeal, all the fruits and vegetables displayed needed to be clean and carefully and frequently trimmed.<sup>54</sup> The line between salable and unsalable items based on the visuality of foods became the criterion of freshness for retailers, who presented to customers a standardized “fresh” look of foods regardless of seasons or regions.

### *Good Lighting for Better Sales*

General Electric introduced fluorescent MAZDA lamps for commercial use in 1938, and revolutionized the American food-retailing scene.<sup>55</sup> Until the late 1930s, many supermarkets had installed ordinary over-size lamps, usually incandescent tungsten bulbs, which generated heat and accelerated the darkening of meat and wilting of fresh produce. During the 1930s and 1940s, lighting manufacturers, particularly the General Electric Company, the Westinghouse Electric and

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<sup>52</sup> “Food Shoppers and Food Selling: Yesterday and Today,” *Progressive Grocer* 18, no. 4 (April 1939). See also “Cleanliness in the Market,” *Meat Merchandising* 2, no. 8 (August 1926): 10.

<sup>53</sup> Head, “The Power of Produce,” 41, 43.

<sup>54</sup> “Give Produce Display Appetite Appeal,” 42, 90.

<sup>55</sup> In an incandescent lamp, illumination was produced by a glowing wire filament, while in a fluorescent tube, a coating on the inside of the tube transformed invisible ultra violet radiation from a mercury arc into visible light.

Manufacturing Company, and Sylvania Electric Products, played a crucial role in transforming the visuality of food stores. They devoted considerable resources to developing better lighting equipment for grocery as well as other businesses. In promoting their lighting equipment to grocers, lighting manufacturers asserted that food lighting served as an important “salesman” as lighting helped enhance the value of display by making the entire store brighter and food items stand out.<sup>56</sup> “SEEING is the biggest thing in the Selling” [emphasis in the original], General Electric claimed in its 1945 fluorescent light advertisement.<sup>57</sup>

Physicist Matthew Luckiesh, who served as the director of General Electric’s Lighting Research Laboratory from 1924 to 1949, conducted extensive research on the relationships between lighting and vision. In his 1934 co-authored work “The New Science of Lighting,” Luckiesh argued: “Seeing is the most universally important activity of human beings and light is just as essential in seeing as eyesight is.”<sup>58</sup> “Improvement of seeing” was of prime importance for Luckiesh in his research on

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<sup>56</sup> “Good Lighting Is Meat Dept. Asset,” *Progressive Grocer* 17, no. 6 (June 1938): 131. See also “Better Lighting Builds a Bigger Business,” *Meat Merchandising* 3, no. 12 (January 1928): 15; Dipman, *The Modern Grocery Store*, 165-70; “Good Lighting Means More Business,” *Meat Merchandising* 5, no. 12 (January 1930): 10; “Is Your Store Lighting Up to Date?” *Progressive Grocer* 16, no. 9 (September 1937): 44; and “New Ways to Light without Glare,” *Progressive Grocer* 17, no. 7 (July 1938): 40.

<sup>57</sup> General Electric Advertisement, *Progressive Grocer* 24, no. 2 (February 1945): 194.

<sup>58</sup> Matthew Luckiesh and Frank K. Moss, *The New Science of Lighting* (Cleveland, OH: Nela Park Engineering Department, General Electric, 1934), 29. For a history of scientific studies on color and lighting, see Regina Lee Blaszczyk, *The Color Revolution* (Cambridge, MA: MIT Press, 2012), 20-44; and Simon Garfield, *Mauve: How One Man Invented a Color That Changed the World* (New York: W. W. Norton, 2000), 190-214.

lighting. He contended that the development of better lighting was critical in order to enhance “an activity of human beings operating as *human seeing-machines*” [emphasis in the original].<sup>59</sup> His concept of lighting development and emphasis on visuality epitomized not only the marketing rhetoric employed by lighting manufacturers, as well as by other equipment and packaging suppliers such as DuPont, but also the construction of a vision-centered food retailing environment. As Luckiesh suggested, many grocers believed that visuality could, and should, be manipulated and improved with the aid of lighting equipment.<sup>60</sup>

Fluorescent lamps were generally more expensive than the incandescent tungsten bulbs. But there were several advantages, especially for meat and produce dealers. The fluorescent light provided food retailers with less food deterioration, better visibility, and brightness. Because it did not produce as much heat as incandescent bulbs and kept relatively cooler, it was less likely to damage perishable products. The white color of fluorescent lights gave meat an attractive appearance. A grocer in Seattle reported to the trade journal *Meat Merchandising* that when the fluorescent light was turned off, the fat in the meat appeared “a dull yellow”; when it was on, the fat became “a creamy white” and the lean took on a “fresh, appetizing color.” He experienced a 30 percent increase in meat sales after the installation of

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<sup>59</sup> Luckiesh and Moss, *The New Science*, 3-4. See also Matthew Luckiesh, *Seeing and Human Welfare* (Baltimore: Williams and Wilkins, 1934).

<sup>60</sup> See “Discolored Meat?” *Meat Merchandising* 24, no. 8 (August 1948): 43; “Is Your Store Lighting,” 45; and “Outshining Competition,” *Meat Merchandising* 17, no. 8 (August 1941): 23-24.

fluorescent lights in the store in 1940.<sup>61</sup> Moreover, compared with incandescent lamps, the fluorescent light was more efficient, as it produced more than double the amount of light from the same amount of current, and lasted about three times as long as incandescent bulbs.<sup>62</sup>

Fluorescent lights were used not only on store ceilings but also inside the display cases. Bright lighting for meat display brought out “the full richness of the coloring and the sparkle of freshness.”<sup>63</sup> The Seeger Refrigerator Company noted in its 1941 meat display case advertisement that “the new ‘Fluorescent’ light floods the case with a brilliant glow without loss of color to food displayed.”<sup>64</sup> In addition, fluorescent lights emitted a small amount of ultraviolet radiation, which helped retard the discoloration of meat by preventing bacteria growth on a surface of cut meat. In 1945, the *Progressive Grocer* reported that when the refrigerator was kept relatively cold (38 to 40°F), with humidity at 85 to 90 percent, the ultraviolet radiation kept the cut surfaces free from air-borne mold and slime, and approximately doubled the time that the packaged meat remained in attractive, salable condition as compared with meat not irradiated.<sup>65</sup>

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<sup>61</sup> Parker Collins, “Sale Increase 30% for Seattle Market as Ultra-Violet Lamps Go to Work to Save Meat,” *Meat Merchandising* 17, no. 4 (April 1941): 60. See also “Outshining Competition,” 25.

<sup>62</sup> “Outshining Competition,” 22-24.

<sup>63</sup> *Ibid.*, 20.

<sup>64</sup> Seeger Refrigerator Company Advertisement, *Progressive Grocer* 20, no. 3 (March 1941): 177. See also “Store Lighting and Meat Sales,” *Meat Merchandising* 29, no. 4 (April 1953): 68, 70.

<sup>65</sup> “Self-Service Packaged Meats,” *Progressive Grocer* 24, no. 4 (April 1945): 166.

Colored light enhanced the freshness appeal of fruits, vegetables, and meat and helped magnify the characteristic color of a display – such as the green of vegetables and the red of meat.<sup>66</sup> Grocers tinted regular fluorescent bulbs green and red colors or purchased pre-colored light bulbs. In a 1941 advertisement, General Electric emphasized “appetizing displays” created by its fluorescent lighting tinted with colors. Its light green glass tubes made fruit and vegetable displays look “fresh and cool,” while the greenish light was not noticeable by human eyes. Fluorescent lights with a light tan shade could “provide a warmer, more appetizing tone” for meats.<sup>67</sup> Retailers also used lighting that contained green or red color rays instead of pure white light. Reddish lighting gave meat an intense red color, and particularly products that were already beginning to turn a grayish-red in daylight appeared to saturate with red colors in lighting.<sup>68</sup> In the same manner, grocers used green lighting above vegetable stands. Yellow or orange lamps tended to accentuate the appearance of light-colored fruits.<sup>69</sup>

Fluorescent lights were available in a wider range of colors than incandescent lights, and by the 1940s, special colors had been developed for food display. Ordinary fluorescent light for room illumination contained “too much blue and too much

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<sup>66</sup> “Colored Spotlight Increases Appeal,” *Progressive Grocer* 14, no. 6 (June 1935): 56.

<sup>67</sup> General Electric Advertisement, *Progressive Grocer* 20, no. 3 (March 1941): 16.

<sup>68</sup> Robertson, *Food Packaging*, 440; and “Self-Service Meat Forum,” *Meat Merchandising* 27, no. 8 (August 1951): 64.

<sup>69</sup> “Colored Lights Are Silence Salesmen,” *Progressive Grocer* 18, no. 8 (August 1939): 98; and Ralph F. Linder, ed., *New Idea Book for Food Merchants* (New York: Progressive Grocer, 1941).

green.”<sup>70</sup> The fluorescent tube marked “White” made meat look grey, even before the meat color actually changed. The “Daylight” tube (which looked bluish in color when lit) could be used for the grocery side, but was not suitable for the meat display.<sup>71</sup> In the late 1940s, the trade journal *Meat Merchandising* advised retailers that the only fluorescent tube that they should use for meat was the “soft white” color, which had a pinkish and slight yellowish cast. Some of these soft white tubes were developed particularly for meat lighting, to slow the color changes of meat and make the product look more attractive.<sup>72</sup> General Electric recommended its “deluxe cool white” light for meat display. Like soft white, it contained a pinkish shade and emphasized warm colors, including pink and red colors of meat products.<sup>73</sup>

When retailers used a pink fluorescent tube for meat display lighting, it tended to make the fat look pink. But by “toning” the white color lighting with a certain amount of red shades, the mixture of white and reddish lighting provided meat a better look. In the late 1940s, one food store in New Hampshire placed a number of overhead red neon identification signs above display cases throughout the meat department. These illuminating signs not only told the shopper where ham, pork, lamb, and steaks were found, but also they distributed red light, mixed with other white lighting in the store, and kept the “fresh” look of all meat products. Another way to add a small amount of pink to meat lighting was to paint bands or stripes of bright red on the

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<sup>70</sup> “Outshining Competition,” 25.

<sup>71</sup> “Discolored Meat,” 43.

<sup>72</sup> Ibid.

<sup>73</sup> “Store Lighting and Meat Sales,” 66.



porcelain reflector or on the light tube itself.<sup>74</sup> New lighting equipment enabled grocers not only to manipulate the color of produce and meats but also to present freshness to consumers as the visual characteristic of perishable items.

### **The Enhancement of “Freshness”**

The creation and presentation of fresh colors required not only the manipulation of store interiors but also of the food itself. Various display techniques and equipment, including green garnishings for meat display, bright lighting, and display case mirrors, helped grocers to promote the appearance of freshness and to present their products attractively. Yet bright lighting, for instance, did not make oranges with blemishes look perfectly orange or turn overripe brown bananas back to yellow. Postharvest handling, refrigeration, and packaging materials helped retailers to maintain the freshness of foods by enhancing the brightness of their colors and retarding their deterioration.

#### *Wax Coating*

As grocery managers increasingly demanded that growers and packers supply better-looking fruits and vegetables in the 1920s and 1930s, post-harvest treatment, particularly wax coating, became a common and crucial practice for agricultural producers to maintain uniform and bright colors of produce before shipping them to food retailers across the country.<sup>75</sup> Some fruits and vegetables, such as citrus, were

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<sup>74</sup> “Discolored Meat,” 43.

<sup>75</sup> Fruit waxing was not a modern development. As early as the twelfth or thirteenth century, Chinese growers used a thick layer of molten wax to retard desiccation of

naturally coated with waxy substances, which prevented water loss. But the effectiveness of the fruit's natural coating was diminished by the soaking, washing, and brushing of fruit in packinghouses. In the 1930s, growers and packers began using synthetic materials, usually petroleum-based, to coat fruits and vegetables, including citrus, apples, pears, carrots, and eggplants.<sup>76</sup> In 1936, a *Progressive Grocer* article noted that "Nature-ripe fruits and vegetables [would] soon be available to city dwellers" due to the "discovery" that "coating them with a thin armor of wax [would] keep them fresh."<sup>77</sup> The author reported that the shelf-life of wax-coated apples was three times longer than untreated apples; and oranges and grapefruit stayed fresh for six months instead of six weeks. Tomatoes could be picked ripe instead of green, and remained fresh twice as long by coating the skins.<sup>78</sup>

The purpose of commercial wax coatings was to extend storage life by reducing the fruits' respiration and moisture loss. The coating also improved the appearance of fruits and vegetables by adding shine to their skins and retarding blemishes caused by product deterioration. For example, wax coatings applied on green apples resulted in delayed yellow color development, softening, and onset of

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citrus fruits. R. E. Hardenburg, "Wax and Related Coatings for Horticultural Products: A Bibliography," USDA Agriculture Research Service Bulletin no. 51-15 (December 1967).

<sup>76</sup> Joseph W. Eckert and Irving I. Eaks, "Postharvest Disorders and Diseases of Citrus Fruits," in *The Citrus Industry* vol.6, eds. Walter Reuther, E. Clair Calavan, and Glenn E. Carman (Oakland, CA: University of California, Division of Agriculture and Natural Resources, 1989), 182.

<sup>77</sup> No Title, *Progressive Grocer* 15, no. 3 (March 1936): 121

<sup>78</sup> Ibid.

mealiness.<sup>79</sup> Waxing materials decreased the loss of sugar and water in carrots, as well as shriveling, shrinkage, and water loss in cucumbers, most root crops, summer squash, pumpkins, sweet corn, eggplant, peppers, and tomatoes.<sup>80</sup> The effect of the coating treatments depended on storage temperature, thickness and type of coating, maturity at harvest, variety, and condition of the fruit.<sup>81</sup> For example, coated immature apples tended to generate off-flavors.<sup>82</sup> Hence thorough and consistent control over harvested produce was indispensable for growers and packers to supply products with bright, uniform colors and to prolong the shelf-life of produce.

### *Refrigeration*

Once agricultural products arrived in retail stores, proper humidity and temperature control of produce displays were important for maintaining the quality of fruits and vegetables and keeping their fresh appearance. When adequate refrigerated

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<sup>79</sup> C. W. Hitz and I. C. Haut, "Effects of Waxing and Pre-Storage Treatments upon Prolonging Edible and Storage Qualities of Apples," Bulletin of the Maryland Agricultural Experiment Station no. A14 (1942); R. M. Smock, "Certain Effects of Wax Treatments on Various Varieties of Apples and Pear," *Journal of the American Society for Horticultural Science* 33 (1935): 284-89; and S. A. Trout, E. G. Hall, and S. M. Sykes, "Effects of Skin Coatings on the Behaviour of Apples in Storage. I. Physiological and General Investigations," *Australian Journal of Agricultural Research* 4 (1) (1953): 57-81.

<sup>80</sup> Hans Platenius, "Wax Emulsions for Vegetables," Cornell University, Agricultural Experiment Station Bulletin no. 723 (April 1939). See also Elizabeth A. Baldwin, "Edible Coatings for Fresh Fruits and Vegetables: Past, Present, and Future," in *Edible Coatings and Films to Improve Food Quality*, eds. John M. Krochta, Elizabeth A. Baldwin, and Myrna Nisperos-Carriedo (Boca Raton, FL: CRC Press, 1994), 35-36.

<sup>81</sup> Trout, Hall, and Sykes, "Effects of Skin Coatings," 57-81.

<sup>82</sup> Baldwin, "Edible Coatings," 28-32.

cases were not widely available in the early twentieth century, water spray and ice were the best means for grocers to keep perishables cool and fresh. Spraying the buds of fruits and vegetables lightly helped prevent, or retard, the wilting and shriveling of produce, improving the “color and sales appeal.”<sup>83</sup> Fruits and vegetables constantly release moisture into the air as part of the ripening process, and loss of water deteriorates their color and general physical condition. Proper humidity helped preserve and regulate the water content of the produce, which helped create a look of “freshness” and “crispness.”<sup>84</sup> Crushed ice, spread under fruits and vegetables in display cases, provided both a low temperature and the proper moisture to keep “the full value of their attractive colors.” Tomatoes, green onions, leaf lettuce, cucumbers, and peppers, displayed on ice, looked “garden fresh, vitamin rich, and delicious to eat.”<sup>85</sup> Moreover, water drops on the skin of produce and crushed ice underneath provided customers with visual cues that fruits and vegetables displayed were kept fresh. Even after better refrigerated cases became widely available, grocers used (and still use) water spray and crushed ice in produce sections.

The development of refrigerated display cases gave the impetus to successful merchandising of perishable foods, especially meat. Commercial refrigerators became available in the 1910s. They were equipped with large tanks of cracked ice and salt to keep foods cold. These display cases took store space and their price was high, hence

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<sup>83</sup> “Trim Them Properly,” 19.

<sup>84</sup> Brand, *Modern Supermarket*, 42-43.

<sup>85</sup> Ward Prickett, “Because We Display with Ice, Our Vegetables Always Look Fresh, Crisp, Appetizing,” *Progressive Grocer* 29, no. 7 (July 1950): 75.

were not suited to small grocery stores.<sup>86</sup> In the mid-1920s, the Frigidaire Company developed refrigerated coils, as a substitute for the cracked-ice and salt tank. This eliminated all the waste space for bunkers, ice, and salt.<sup>87</sup> In the late 1930s, the Great Atlantic & Pacific Tea Company (A&P), the leading American chain store, pioneered the self-service refrigerated meat case. A&P's engineers converted a fish and delicatessen case into a usable meat case. Equipment manufacturers modified A&P's improvised case, and began manufacturing refrigerated display cases designed for self-service meat by the 1940s.<sup>88</sup> They pitched the visual appeal and freshness of meat that their refrigerators provided. "[Consumers] see what they want and buy what they see!" – one of the leading display case manufacturers, Hussmann, advertised, stressing visibility as a key to successful meat merchandising.<sup>89</sup>

When A&P opened its first "self-service" meat departments in four of its stores in June 1941, the news "spread like wildfire" among grocers in the northeastern states.<sup>90</sup> It was initially a combination of service-type and self-service merchandising.

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<sup>86</sup> Andrew D. Althouse and Carl H. Turnquist, *Modern Electric and Gas Refrigeration*, 4th ed. (Chicago: Goodheart-Willcox, 1944), 361-63.

<sup>87</sup> Zimmerman, *The Super Market*, 154-55.

<sup>88</sup> Brand, *Modern Supermarket*, 32; and Mayo, *The American Grocery Store*, 159.

<sup>89</sup> Allied Store Utilities Company, HUSSMAN Advertisement, *Meat Merchandising* 16, no. 7 (July 1940): 32-33. See also C. V. Hill & Company Advertisement, *Progressive Grocer* 20, no. 5 (May 1941): 28; Ed Friedrich Sale Corp. Advertisement, *Progressive Grocer* 20, no. 7 (July 1941): 3; and Super-Cold Advertisement, *Progressive Grocer* 24, no. 5 (May 1945): 183.

<sup>90</sup> Remus Harris, "Self-Service Meats Are Introduced by A&P," *Progressive Grocer* 20, no. 6 (June 1941): 46.

In each store, butchers cut, weighed, packaged, and priced meats in a back room in anticipation of the day's sale, and displayed the packaged meat in self-service cases. A clerk was responsible for servicing the "self-service" case to supervise the products and consult with consumers who were not used to buying self-serve meat.<sup>91</sup> The new operation was relatively successful, increasing meat sales in the experimental stores by about 30 percent.<sup>92</sup>

Until the post-war period, however, refrigeration cases were ineffective in cooling foods for complete self-service operation, although they helped grocers prolong the shelf life of produce and meat relatively longer than before. Two layers of packaged meats were ideal for refrigeration in self-service open display cases because the temperature of 35°F could be maintained. On busy days, however, grocers piled the meats in three or four layers. Unless the meats moved quickly, the height of the packaged meats raised the temperature to 45 to 50°F in the top two layers, resulting in discoloration and shrinkage. To prevent the deterioration of meat color, clerks needed to rotate the packages; the self-service meat department hence required constant supervision.<sup>93</sup> One grocery owner noted in the mid-1940s that until "properly refrigerated transportation and display equipment is available, peak 'farm-to-table' freshness cannot be maintained."<sup>94</sup>

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<sup>91</sup> Ibid., 46-69. See also Zimmerman, *The Super Market*, 61.

<sup>92</sup> Mayo, *The American Grocery Store*, 159.

<sup>93</sup> Harris, "Self-Service Meats," 61.

<sup>94</sup> Albert Eisner, Jr., "What We Have Learned about Prepackaged Produce," *Chain Store Age* 22 (October 1946). See also Albert Todoroff, "Latest Developments in Packaging: Self-Service Meats," *Meat Merchandising* 20, no. 9 (September 1944).

### *Transparent Film*

While A&P's first self-service meat department was relatively successful compared with earlier ones, the leading chain store still faced the problem of meat discoloration. Store clerks constantly watched over display cases and removed discolored meat from the case. Grocers needed, in addition to adequate refrigerated cases, a packaging material that preserved color and was mechanically strong enough to protect the meat.<sup>95</sup>

To prolong meat's red color over time, the outer wrapper had to permit the free passage of oxygen to the surface of the meat. While excessive moisture loss should be avoided, the surface of the meat had to be relatively dry to impede mold growth. The package needed to provide controlled water vapor passage, odor-proofness, flavor-proofness, grease-proofness, and inertness to wet products. It also needed to be relatively inexpensive.<sup>96</sup> In addition, meat retailers believed that the transparency of packaging materials was "mandatory" in self-service meat display as the package was "the salesman" and the buyer could make a choice without the intervention of in-store butchers.<sup>97</sup> Transparent films manufactured prior to the mid-1940s were not equipped with all the qualities necessary for wrapping meat for self-service merchandising.

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<sup>95</sup> E. I. du Pont de Nemours & Company (DuPont), "Color Sells Prepackaged Meats," *Packages and People* 15, no. 3 (1951), folder 8, box 1, DuPont Film Department Collection (Accession 2168), Hagley Museum and Library, Wilmington, DE. *Packages and People* was DuPont's in-house magazine. See also "Here Are Facts on Color Changes," *National Provisioner* 143, no. 27 (December 31, 1960): 10.

<sup>96</sup> "Maximum Salable Life for Fresh Meats Can Be Achieved by Use of Proper Packaging Materials and Methods," *National Provisioner* 134, no. 15 (April 14, 1956): 34; and "Problems in Packaging," 76-76A. See also Mautz, "A Discussion," 42.

<sup>97</sup> "Problems in Packaging," 76.

The first transparent film was invented by Swiss textile engineer Jacques Brandenberger in 1908. Brandenberger created cellulose film derived from wood pulp, and named it “cellophane” from the French words *cellulose* and *diaphane* (“transparent”). In 1917, Brandenberger assigned his patents to La Cellophane Société Anonyme, a new French company formed to commercially promote his invention. In the United States, one of the first customers for cellophane was Whitman’s candy company, which began using the film to over-wrap chocolate boxes in 1913. Whitman’s imported cellophane from France until 1923, when La Cellophane licensed to E. I. du Pont de Nemours & Company (DuPont) the exclusive rights to manufacture and sell cellophane in the United States.<sup>98</sup>

Cellophane was the earliest transparent packaging material used for foods. Initially, its sales and use were limited, primarily used as an outer wrapper. While cellophane was water proof, it was not moisture proof; the film hence was not useful for direct packaging of many food products that needed to be protected from water vapor. In addition, cellophane was expensive compared to other flexible packaging materials, such as waxed papers, parchment papers, and glassine, which had been used

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<sup>98</sup> By 1922, out of 400 tons of cellophane manufactured globally (in France), nearly 40 percent was sold in the United States. DuPont was engaged in the cellophane business through its subsidiary, DuPont Cellophane Company, in which DuPont held 52 percent interest and La Cellophane held the rest of its interest. In April 1924, the first DuPont cellophane was made in a new plant at Buffalo, New York, and the company later added three more plants for cellophane production in Old Hickory, Tennessee; Richmond, Virginia; and Clinton, Iowa. George W. Stocking and Willard F. Mueller, “The Cellophane Case and the New Competition,” *American Economic Review* 45, no. 1 (March, 1955): 22-23; C. H. Ward-Jackson, *The “Cellophane” Story: Origins of a British Industrial Group* (Edinburgh, UK: William Blackwood, 1977), 37; and United States v. E. I. du Pont de Nemours & Co., 118 F. Supp. 41 (1953). See also E. I. du Pont de Nemours & Co. v. Sylvania Industrial Corporation, 122 F.2d 400 (1941).



for foods extensively up to that time. Since these materials were mostly opaque, DuPont promoted cellophane's transparency as the major selling point. However, many food producers and retailers, whose profit margin was relatively low, were reluctant to shift from papers and other less expensive wrappers to the newly developed film, believing that what they had been using was good enough.<sup>99</sup>

After DuPont chemists successfully developed moisture-proof cellophane in 1927, food manufacturers began using the film for packaging various products, including baked goods, cheese, sliced bacon, hams, sausages, and other cured meat products.<sup>100</sup> In insisting on the importance of visual information for consumers in buying foods, DuPont managers argued that vision was the ideal and most effective way to discern various traits of foods and stimulate other senses. The firm's 1928 brochure noted that through cellophane, "every detail of color, size, shape and texture [was] clearly apparent."<sup>101</sup> The company linked vision to gustatory sensation in particular, insisting that food's "delicious appearance tickles the palate and tempts the customer to buy."<sup>102</sup>

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<sup>99</sup> 118 F. Supp. 41.

<sup>100</sup> David A. Hounshell and John Kenly Smith, Jr., *Science and Corporate Strategy: Du Pont R&D, 1902–1980* (New York: Cambridge University Press, 1988), 170. See also Mautz, "A Discussion," 45; John M. Ramsbottom, "Some Aspects of Meat Packaging," in *New Potentials in Consumer Packaging*, ed. M. J. Doohar (New York: American Management Association, 1955), 14.

<sup>101</sup> DuPont, "Cellophane: Modern Merchandising Aid," 1928, Hagley Museum and Library.

<sup>102</sup> *Ibid.*

The moisture proof cellophane, however, was brittle and nondurable at low temperatures, and thus not well suited for self-service meat display cases.<sup>103</sup> Nor did the film solve the problem of meat discoloration due to inadequate moisture control inside the package. Discoloration occurred on the bottom of meat where it rested upon cellophane (grocers usually wrapped meat directly in cellophane).<sup>104</sup> In fact, when A&P first started its self-service operations in 1941, the store used cellophane to provide visibility to shoppers, and inserted a sheet of waxed paper between the meat and the film to prevent discoloration.<sup>105</sup>

Many chemical and packaging manufacturers saw the commercial potential of transparent film during the 1930s and 1940s, competing keenly against each other. In 1930, the Sylvania Industrial Corporation began manufacturing cellophane under a Belgian patent (DuPont's cellophane was based on a French patent).<sup>106</sup> In 1936, the Goodyear Tire and Rubber Company introduced a rubber based film called Pliofilm. Other chemical companies also developed transparent films for food packaging, including the Dow Chemical Company's "Saran"; the Dewey and Almy Chemical Company's "Cry-O-Rap"; and the Celanese Company's "Lumarith" cellulose acetate film.<sup>107</sup>

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<sup>103</sup> Mautz, "A Discussion," 45-46; and Ramsbottom, "Some Aspects," 14.

<sup>104</sup> "Self-Service for Meat Uncorks," 24.

<sup>105</sup> "How the A&P Packages Meat for Self-Service," *Progressive Grocer* 20, no. 7 (July 1941): 58-59.

<sup>106</sup> The Belgian patent Sylvania used was held by Société Industrielle de la Cellulose (SIDAC).

<sup>107</sup> 118 F. Supp. 41.

DuPont held a relatively advantageous position in the transparent packaging market. Soon after Sylvania introduced its cellophane, DuPont sued successfully for patent infringement. In 1933, the two companies made a contract, which ensured DuPont of an 80 percent share of the cellophane market in the United States.<sup>108</sup> Goodyear Tire's Pliofilm was highly transparent and resistance to tearing, and had the ability to control the loss of moisture from the product and still permitted the transfer of enough oxygen to the meat to retain its bright color. Due to its higher price, however, the sale of Pliofilm remained smaller than DuPont's cellophane: in 1939, Pliofilm sales were 2 percent of cellophane sales; by 1949 they increased only to 4.4 percent.<sup>109</sup> These various films provided protection and transparency for the packaging of a wide range of food products. Yet none of them were adequate as self-serve meat wrappers.

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<sup>108</sup> DuPont licensed Sylvania to manufacture and sell moisture-proof cellophane produced under the DuPont patents at a royalty of 2 percent of sales. The contract also required that sales of moisture-proof cellophane by Sylvania be restricted to 20 percent of the two companies' combined sales of moisture-proof cellophane. The rate was to increase by 1 percent until it reached 29 percent in 1942. Although the production and sale of cellophane by Sylvania gradually increased after 1933, due to the 20 percent limiting clause, the company was not a greatest competitor for DuPont, which could still maintain an 80 percent share of the cellophane market. Sylvania paid DuPont approximately \$1,500,000 in royalties under the 1933 agreement from April 1933 to January 1, 1945, when the limiting clause was dropped. In 1946, Sylvania was acquired by the American Viscose Corporation with assets of over 200 million dollars. Stocking and Mueller, "The Cellophane Case," 43; 118 F. Supp. 41; *United States v. E. I. du Pont de Nemours & Co.*, 351 U.S. 377 (1956).

<sup>109</sup> Stocking and Mueller, "The Cellophane Case," 49.

### Packaging “Freshness” for Self-Service

In the early 1940s, although neither adequate refrigeration technology nor adequate packaging materials was yet available, self-service merchandising began to grow. The labor shortages spawned by World War II helped augment self-service, or semi-self-service, retailing. Almost all butchers at the time were men, and many butchers and meat department retail clerks joined the armed forces. Others turned to higher paying war plant jobs. Many grocers believed that self-service merchandising would be an effective solution for the labor shortage in the grocery business.<sup>110</sup> It was not until the postwar years that the majority of meat departments became completely self-service. But many store managers introduced some form of self-service for meat and produce departments during the war.<sup>111</sup>

After World War II, breakthroughs in refrigeration technology helped expand self-service meat merchandising. Although war-time material shortages and factories converted to war production had curtailed the manufacture of refrigerated cases, equipment makers resumed making self-service meat cases after the war and actively promoted their products.<sup>112</sup> In a 1946 advertisement, Friedrich Refrigerators Inc. claimed in *Meat Merchandising*: “Your meat looks better and sells better in Friedrich Floating Air Refrigerators.” Stressing the importance of visibility and color contrast

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<sup>110</sup> Some store operators employed women in their meat department during the war. “Man Power in the Market,” *Meat Merchandising* 18, no. 5 (May 1942): 20; and “The Women Take Over,” *Meat Merchandising* 18, no. 1 (January 1942): 18.

<sup>111</sup> “First Self-Service Meats in Arkansas They Made It Work,” *Meat Merchandising* 23, no. 7 (July 1947): 42; and Mayo, *The American Grocery Store*, 159. See also Sam Teitelman, “Self-Service Meat Retailing in 1950,” *Journal of Marketing* 15, no. 3 (January 1951): 30.

<sup>112</sup> Brand, *Modern Supermarket*, 32, 34.

for meat display, the firm offered a color image of various cuts of meat displayed with green garnishings in its refrigerated case.<sup>113</sup> In the late 1940s, DuPont developed Freon, which held display cases under 40°F, as the primary refrigerant for open-topped meat cases.<sup>114</sup> With open-top refrigerated cases, customers could look down at meat packages lined up neatly in display. They could view the meat from a distance or choose a package that looked good and inspect it up close.

The development of a new transparent film also promoted complete self-service. In 1946, DuPont finally introduced cellophane with controlled moisture-proofness and high oxygen transmission rate, effective for wrapping self-service meat.<sup>115</sup> One side of the film was coated with water-resistant nitrocellulose. When the uncoated side (so-called “wetable” side) was kept in contact with the moist fresh meat, it absorbed the moisture on the meat surface. The outer, coated side prevented the escape of moisture. Both sides of the sheet permitted transmission of a moderate amount of oxygen sufficient to prevent bright red meat from turning to brown and preserve the bloom of the cuts.<sup>116</sup> The new cellophane offered meat department operators other advantages, such as ease of handling, clarity, adaptability to various

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<sup>113</sup> Friedrich Refrigerators Inc. Advertisement, *Meat Merchandising* 22, no. 11 (November 1946): 13.

<sup>114</sup> Deutsch, *Building*, 188

<sup>115</sup> Mautz, “A Discussion,” 46-47; “Oxygen Control”; and “Problems in Packaging,” 76A. See also Thor and Tauber, “New Ideas,” 23-24.

<sup>116</sup> “Give Me Packaged Meats,” 31; Lavers, “Discoloration,” 127; “Maximum Salable Life for Fresh Meats Can Be Achieved by Use of Proper Packaging Materials and Methods,” *National Provisioner* 134, no. 15 (April 14, 1956): 34; “Problems in Packaging,” 76A-B; and Ramsbottom, “Some Aspects,” 14-16.

sizes of meat cuts, and low cost. Its strength and resistance to tears also made it possible for shoppers to handle meat wrapped in cellophane without harming the product.<sup>117</sup>

The number of self-service meat departments increased rapidly during the late 1940s and 1950s. In 1946, there were only twenty-eight supermarkets with complete self-service in the meat department; by 1953, more than 50 percent of all supermarkets in the United States offered total self-service for packaged fresh meat, and by the end of the decade, self-service became the typical way to shop for meat in American supermarkets.<sup>118</sup>

Innovations in refrigeration and packaging materials also allowed food retailers to prepackage agricultural produce for self-service. Supermarket operators had begun experimenting with the prepackaging of fruits and vegetables during the war years.<sup>119</sup> Among the first to enter this field was A&P, which set up test stores in the Columbus, Ohio, area, in 1944 and conducted research on methods for prolonging the shelf-life of perishable products.<sup>120</sup> Produce departments never became totally dominated by

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<sup>117</sup> Lavers, "Discoloration," 125.

<sup>118</sup> Mayo, *The American Grocery Store*, 177. See also Horowitz, *Putting Meat*, 141-42.

<sup>119</sup> DuPont, "A Forward Step in Vegetable Merchandising," 1944, Hagley Museum and Library; DuPont, "Merchandising Trends in Fresh Fruits and Vegetables," 1940, Hagley Museum and Library; and "Produce Self-Service Successful," *Progressive Grocer* 24, no. 8 (August 1945): 140.

<sup>120</sup> Zimmerman, *The Super Market*, 147.

prepackaging or self-service, but by the early 1950s, nearly 45 percent of the produce departments in American supermarkets were operated on a self-service basis.<sup>121</sup>

Most of the packaging operation was the work of retailers rather than producers or packers. Once boxes of bulk produce came into the packaging room in supermarkets, grocers sorted, trimmed, cleaned, and packaged the products. They usually used moisture-proof cellophane and other transparent films. Large items and those of irregular shape were wrapped in a sheet of cellophane and heat-sealed. Smaller items were slipped into cellophane bags and either heat-sealed or twisted to close. Items that need special protection were placed in trays, then wrapped in cellophane. After packaging, store clerks weighed each item, marked the price, and placed it in cartons, which were then sent to the retailing floor and placed in refrigerated self-service cases.<sup>122</sup> Some produce, including washed spinach and tossed salad, was not packaged in retail stores because extensive equipment was needed and the packaging of these items could best be done through a large-scale operation at the grower or packer level.<sup>123</sup>

The greatest problem for produce prepackaging during the 1940s and 1950s was to maintain the quality of produce within the package. Customers could no longer directly touch or smell many of the packaged items and became more dependent on sight in selecting foods. Some stores received complaints from their customers that

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<sup>121</sup> Ibid.

<sup>122</sup> John R. Mitchell, "I Slashed Spoilage and Boosted Produce Sales by Prepackaging + Refrigeration," *Progressive Grocer* 26, no. 4 (April 1947): 187.

<sup>123</sup> "Which Fruits and Vegetables Shall I Package First?" *Meat Merchandising* 33, no. 5 (May 1953): 40.

they were disappointed by packaged produce because its quality was not consistent. Consumers also noted that some packaged items did not provide sufficient visibility.<sup>124</sup> Grocery manuals and trade journals advised retailers to package only top quality fruits and vegetables to guarantee the quality of packaged produce, and warned that when consumers found undesirable quality in a package, the store would lose their trust.<sup>125</sup>

Yet packaged fruits and vegetables were generally more advantageous to grocers than selling produce in bulk: less waste, increased profit, and faster service.<sup>126</sup> Careless handling by consumers and store clerks often damaged fruits and vegetables. Customers for instance tended to toss lettuce around the display case, and the leaves became loose, fell off, and discolored. When a head of lettuce was in a package, it could withstand handling by consumers and retailers.<sup>127</sup> At a supermarket in Belleville, Illinois, losses of lettuce fell to under 2 percent as compared with 11 to 12 percent losses before the store started prepackaging every head individually.<sup>128</sup>

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<sup>124</sup> Ibid.

<sup>125</sup> Brand, *Modern Supermarket*, 46; Lucas, "Why We're Strong," 74; and Zimmerman, *The Super Market*, 234.

<sup>126</sup> "How Self-Service Experts Sell Fresh Fruits & Vegetables," *Progressive Grocer* 24, no. 8 (August 1945): 66; Kline, "How to Merchandise," 56; and "Produce Self-Service Successful," *Progressive Grocer* 24, no. 8 (August 1945): 140. See also Simmons, "Packaging Aids," 514; and F. W. Spannagel, "Pre-Packaging Produce at Retail Store Level," *Meat Merchandising* 29, no. 2 (February 1953): 37.

<sup>127</sup> "How to Pre-Package Lettuce at Retail Level," *Meat Merchandising* 29, no. 1 (January 1953): 29

<sup>128</sup> "Pre-Packaging Has Boosted My Gross Profit on Produce by 7 Percent," *Meat Merchandising* 28, no. 10 (October 1952): 37-38.



A drop in spoilage losses, as well as better appearance, meant better profits and better sales. Prepackaged vegetables generally outsold those sold in bulk, even when bulk produce was less expensive.<sup>129</sup> In one supermarket in Wichita Falls, Texas, produce sales rose from 12 percent of total store sales to 20 percent within a few months after switching to self-service retailing of prepackaged produce in 1946.<sup>130</sup> According to a 1954 survey, a store in Minnesota increased the produce department's share of total store sales an average of 2.5 percent after converting to complete self-service of packaged produce.<sup>131</sup>

Convenience for consumers was another advantage of packaged self-serve produce.<sup>132</sup> Packaged fruits and vegetables were easier to carry and store. There was no need for customers to wait for a clerk to weigh and price the merchandise. They had ample time to make selections and comparisons from a large variety of produce attractively displayed in open refrigerated cases.<sup>133</sup> In addition, it was no longer necessary to shop for fruits and vegetables early in the day, soon after they arrived at the store, because packaging and refrigeration in the store guaranteed that everything

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<sup>129</sup> No title, *Progressive Grocer* 27, no. 4 (April 1948): 124; and "Tests in Sixty Stores Prove Prepackaging Lifts Produce Sales," *Progressive Grocer* 33, no. 7 (July 1954): 40.

<sup>130</sup> John D. Lucas, "Why We're Strong for Prepackaged Produce in Open Refrigerated Cases," *Progressive Grocer* 26, no. 1 (January 1947): 72.

<sup>131</sup> George E. Kline, "How Super Valu Stores Package Produce for Better Sales, Margins, Profits," *Progressive Grocer* 33, no. 8 (August 1954): 52.

<sup>132</sup> Eisner, "What We Have Learned."

<sup>133</sup> No title, *Progressive Grocer*, 124; and Lucas, "Why We're Strong," 72.

stayed “just as fresh, crisp, and healthful” later in the day as it was in the morning.<sup>134</sup> Produce also kept longer in the home, for when only a portion of the whole vegetable or fruit was used, consumers could store the remaining part in the package and put it back in the refrigerator. Consumers generally preferred prepackaged self-serve produce to bulk retailing. One market study reported that nearly 90 percent of women interviewed preferred to buy tomatoes in transparent wrapping.<sup>135</sup>

Newly improved refrigeration also helped maintain the fresh look of packaged produce.<sup>136</sup> Low temperature retarded the ripening of fruits and vegetables and prevented shrinkage of perishables significantly, prolonging their shelf-life.<sup>137</sup> In explaining the advantage of converting all departments, including meat and produce, into self service, a 1946 *Meat Merchandising* article argued that the “keystone of good produce sales” was freshness and that grocers could give their produce “the freshest appearance possible by using refrigerated self-service display cases.”<sup>138</sup> Grocers also emphasized that refrigeration of packaged produce enabled efficient and economical store operation.<sup>139</sup>

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<sup>134</sup> Mitchell, “I Slashed Spoilage,” 193.

<sup>135</sup> DuPont, “You Can Sell More Tomatoes: A Consumer and Retail Store Survey on the Use of a ‘Cellophane’ Transparent Wrap,” 1934, folder 7, box 45, DuPont Advertising Department Collection (Accession 1803), Hagley Museum and Library.

<sup>136</sup> Mitchell, “I Slashed Spoilage,” 193; and Lucas, “Why We’re Strong,” 72.

<sup>137</sup> Lucas, “Why We’re Strong,” 72.

<sup>138</sup> “The Case for Self-Service What Can You Lose?” *Meat Merchandising* 22, no. 12 (December 1946): 24

<sup>139</sup> W. J. Stelpflug, “Pre-Packaging of Perishable Foods: Another Step Forward in the Evolution of Grocery Merchandising,” *Modern Packaging* 17 (August 1944).

As self-serve produce and meat departments became the norm for many supermarkets in the late 1940s and 1950s, the new retailing system transformed the ways consumers understood the freshness of foods and the relationships between customers and store clerks. The bright produce and meat display provided customers with visual information about the freshness of the product while eliminating clerk-customer interactions.<sup>140</sup> In a meat department, butchers and “wrapping girls” who weighed and wrapped meat usually worked in a back room.<sup>141</sup> Produce section clerks also became involved mainly in prepackaging produce in a specially-designed room commonly at the rear of the store.<sup>142</sup> Consumers increasingly relied on their eyes in selecting foods, in modern supermarkets where bright foods were presented while human labor was disguised.

While the work of grocers became invisible to customers, the natural beauty and abundance that fresh foods embodied became a product of constant control and close supervision by store clerks. Transparent packages provided consumers with better visibility while allowing retailers to control and maintain a fresh, bright look of perishable foods. Refrigerated display cases also enabled grocers to prolong the freshness of produce and meat. Bright meat bloom, shining red tomatoes, and brilliant

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<sup>140</sup> For the historical transformation of the relationships between grocery employees and consumers, see Deutsch, *Building*.

<sup>141</sup> “They Pre-Package All Perishables,” *Meat Merchandising* 23, no. 3 (March 1947): 42; “Operating Costs,” *Meat Merchandising* 24, no. 6 (June 1948): 70

<sup>142</sup> “Big Boom in Self-Service Meats,” *Meat Merchandising* 25, no. 6 (June 1949): 39; and Mayo, *The American Grocery Store*, 177-78.

green spinach, sealed in transparent film and displayed in refrigerated cases, represented “industrial freshness,” where nature and technology intersected (Fig.19).



Figure 19 DuPont advertisement, 1955. Division of Work & Industry National Museum of American History, Smithsonian Institution.

### Problems of Better Visibility

Lighting and transparent packaging, which were supposed to help create eye-appealing display in food stores, turned out to be the sources of a discoloration problem, particularly for cured meat products. Due to the increasing use of transparent packaging in mid-twentieth-century supermarkets, meat products were always exposed to direct light, which accelerated discoloration. The degree of meat discoloration depended on the intensity of the light and the length of time the meat was exposed. Processed meats discolored faster than fresh meats. Intense light discolored cured meats by stimulating oxidation of the products within one hour after slicing. Thus to prevent fading of meat colors, exposure to strong lighting or to oxygen needed to be avoided completely.

Especially after the development of fluorescent lights, discoloration became a critical problem for many grocery operators. Fluorescent lights were less likely to discolor meat products than incandescent bulbs. Nonetheless they still deteriorated the color of both fresh and cured meats when lighting was strong.<sup>143</sup> The store lighting in the new or remodeled market was generally much brighter than earlier stores due to new design and new types of light bulbs. Many retailers used stronger light for better visibility in the entire store and display cases, increasing the amount of light that reached meats.<sup>144</sup> The average open display case of the early 1950s was equipped with sixty foot-candles of light – enough to discolor bacon in half a day. After two days this

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<sup>143</sup> “Store Lighting and Meat Sales,” 62-63; and “Self-Service Meat Forum,” *Meat Merchandising* 27, no. 8 (August 1951): 64.

<sup>144</sup> “How Can I prevent Discoloration,” *Meat Merchandising* 27, no. 7 (July 1951): 44; and “What Prevents Discoloration,” *Meat Merchandising* 28, no. 6 (June 1952): 40-41.

brightness made the product “completely unsaleable.”<sup>145</sup> If light was less intense, discoloration could be retarded for half a day; but if the product was not selling rapidly, light needed to be blocked entirely.<sup>146</sup>

For meat retailers, “discoloration” meant not merely the physical change of meat color but a loss of sales appeal as well as the deterioration of visual environment in the entire store. “Ten thousand retailers with the same headache! The seriousness of this [discoloration] problem must not be underestimated,” the trade journal *Meat Merchandising* declared in 1950:

The usual pleasant aura surrounding food shopping is lost, and it is difficult to measure total store sales lost by lack of appeal of one discolored slice of meat. Ironically, fading can by no means be used as an indication of quality in luncheon meats. A slice of meat may be rancid, overage and spoiled, and still have an appetizing appearance. On the other hand, fresh sausage which has been exposed to light for several hours, although still tasty may frighten sausage eaters away by its gray appearance.<sup>147</sup>

Stressing the importance of eye appeal, the author indicated that the sense of sight was more important than taste in selling and purchasing meat. Especially in self-service stores, where consumers could not taste the product and had fewer opportunities to ask store clerks about product quality than at butcher shops, they could in fact be “frighten[ed]” by the “gray appearance” of meat without knowing whether the product was deteriorated.

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<sup>145</sup> “How Can I prevent Discoloration,” 44.

<sup>146</sup> Ibid.; and “What Prevents Discoloration,” 40-41.

<sup>147</sup> “Fading in Processed Meats,” *Meat Merchandising* 26, no. 10 (October 1950): 41.

The improvement of packages was one way to prevent the discoloration of cured meats. In the 1950s, several large meat packers introduced vacuum packaging to prevent oxidation. But it was impractical in a retail operation without sufficient equipment.<sup>148</sup> Retailers tried to solve the discoloration problem by placing a piece of waxed paper on one side of each package. Wrapped packages were displayed in a self-service case, waxed paper side up. The paper shut out the light from inside the package while the other side of the package allowed consumers to see the product. The waxed paper also shielded cured meats from the heat of the sealing iron, used for closing the wrapper and attaching a label. Yet customers needed to pick up a package and turn it over to see the product.<sup>149</sup> Retailers also experimented with a so-called “stop light label” (also known as the coverall label, full face label, and picture pack label). It covered the whole face of the package, blocking out all light on the exposed side. While the package did not show the actual product, a full color illustration of a product helped consumers know which item was in the package.<sup>150</sup> Still, the most practical means of maintaining maximum sales appeal in the display and for minimizing discoloration was to supervise the display frequently and to rotate packages, although this operation increased labor costs.

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<sup>148</sup> Horowitz, *Putting Meat*, 66-67; and “Stop Discoloration,” *Meat Merchandising* 25, no. 10 (October 1949): 72.

<sup>149</sup> “Stop Discoloration,” 72.

<sup>150</sup> “Here’s How to Know What Prevents Discoloration,” *Meat Merchandising* 28, no. 6 (June 1952): 40-41; “How Can I prevent Discoloration,” 44; and “Self-Service Meat Forum,” *Meat Merchandising* 27, no. 4 (April 1951): 77.

Meat packers and retailers also manipulated physiological and chemical constituents of meat by using food additives, rather than adjusting external conditions (such as bright lights), to give the products a particular color that consumers considered “fresh.” Since the nineteenth century, meat packers had been adding synthetic dyes to sausages and other meat products to give them a “fresh” and “natural” red shade of meat. Meat packers and processors also used sweeteners to maintain the red color of cured meats and add flavor to the finished products.<sup>151</sup> Later in the mid-twentieth century, chemical companies introduced various additives, such as chemical preservatives, for preventing the discoloration of cured meats.<sup>152</sup> In the 1940s, chemical firms, including Pfizer, Inc. and Calgon, Inc., began supplying antioxidant additives, particularly a substance called ascorbic acid, which would keep bright color of cured as well as fresh meats.<sup>153</sup> “In hams color makes sales!” Calgon proclaimed in an advertisement for ascorbic acid product in 1956.<sup>154</sup> Sterwin Chemicals Inc., which also manufactured ascorbic acid additives, declared that “since customers usually ‘buy by eye’ these products have a plus that means extra

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<sup>151</sup> Y. H. Hui, ed., *Handbook of Meat and Meat Processing* (Boca Raton, FL: CRC Press, 2012), 488-89, 532.

<sup>152</sup> “Meat Stabilizer,” *Meat Merchandising* 25, no. 9 (September 1949): 36.

<sup>153</sup> Kenneth J. Carpenter, *The History of Scurvy and Vitamin C* (New York: Cambridge University Press, 1986), 209-10; Hui, *Handbook of Meat*, 537; and M. D. Ranken, “The Use of Ascorbic Acid in Meat Processing,” in *Vitamin C (Ascorbic Acid)*, ed. J. N. Counsell and D. H. Corning (New York: Applied Science, 1981).

<sup>154</sup> Calgon, Inc., Advertisement, *National Provisioner* 135, no. 2 (July 13, 1956): 28.



salability.”<sup>155</sup> Similarly, in promoting its antioxidant additives, Merck & Company touted the “eye appeal” that its products provided and asserted that “consumer appeal in meat [was] largely a matter of product color.”<sup>156</sup> The addition of dyes, sweeteners, and preservatives made meat products “chemically fresh” and provided retailers with more stable and reliable ways of manipulating the freshness of foods than refrigeration and packaging.

### **Conclusion**

As self-service merchandising expanded in the mid-twentieth century, the visual perception of freshness became increasingly separated from the temporal definition. Modern store equipment and packaging materials provided consumers a new way of understanding product quality and a new buying experience. Customers looking at shining tomatoes and bright red meat made assumptions about their quality based largely on how they looked, rather than how much time had passed after fruits and vegetables were harvested and meat was packaged. Freshness was no longer a natural state of foods but a marker of marketability that producers and retailers carefully controlled in a sanitized, standardized environment.

With systematic efficiency and constant control over the mass display of uniformly bright foods, grocers constructed a particular aesthetic of freshness that represented brightness, sanitation, and abundance. The technological development of

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<sup>155</sup> Sterwin Chemicals Inc., Advertisement, *National Provisioner* 134, no. 8 (August 1956): 43.

<sup>156</sup> Merck & Co. Inc., Advertisement, *Meat Magazine* (June 1958).

packaging and store equipment enabled grocers to establish a new retailing system, transforming not only the way they sold and presented foods to customers but also the new visual environment in the store. Refrigerated display cases, transparent packages, and lighting equipment enabled grocers to create bright, clean, and orderly displays of produce and meat, as well as the entire store, providing consumers a sense of freshness.

## Chapter 5

### THE PALETTE OF DOMESTICITY

“The shapes of desserts and their prettiness, colorfulness, and playfulness embody symbols of femininity,” declared Ernest Dichter, a prominent mid-twentieth-century market researcher.<sup>1</sup> In analyzing the cultural significance of desserts as feminine symbols in American society, he contended that a woman’s “concern with the eye appeal of the dish, her ability to impart the telling decorative touch, the qualities of lightness, delicacy and grace all symbolize her essential femininity.”<sup>2</sup> As Dichter’s market studies in general and his observation on food in particular rested largely on the contemporary understanding of gender roles and consumption patterns, his studies were by no means a “scientific” or “objective” analysis of the market. Rather his emphasis on the appearance of food as the representation of femininity and female virtue epitomized the relationships between gender ideology and visuality of food in the mid-twentieth-century United States.

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<sup>1</sup> Ernest Dichter, *Handbook of Consumer Motivations* (New York: McGraw-Hill, 1964), 37. Ernest Dichter was born in Vienna in 1907. He received a doctorate in psychology from the University of Vienna in 1934, and moved to New York in 1938 to escape the Nazis. He became a pioneer in the development of “motivational research,” a marketing methodology that used psychological techniques to probe consumers’ desires and responses to products and certain brands.

<sup>2</sup> Ibid. For historical discussion on Dichter’s marketing methodology, see Stefan Schwarzkopf and Rainer Gries, eds., *Ernest Dichter and Motivation Research: New Perspectives on the Making of Post-War Consumer Culture* (New York: Palgrave, 2010).

Since the late nineteenth century, visually appealing dishes, especially colorful delicate desserts, had been associated with women's social, economic, and gender identity. During the late nineteenth through the early twentieth century, domestic scientists and food advertisers promoted to female consumers the creation of ornamental, so-called "dainty" foods as the representation of white middle- and upper-class femininity and women's aesthetic taste while teaching them how to cook and how to use new products. Colorfully decorated dishes, such as gelatin molds and ice cream, embodied sweetness, purity, and delicacy, which symbolized the disposition of "true" ladies.<sup>3</sup>

Making colorful decorative dishes required artificial treatment of foods. Until the late nineteenth century, most ingredients, including food colors, had been from "natural" sources, such as fruit and vegetable juices. Yet the creation of dainty dishes involved the artificial manipulation of food and nature: foods were molded into various shapes; and fruits and vegetables were cut and arranged in an orderly manner based on a color scheme. At the turn of the twentieth century, as commercially-produced food dyes and powdered gelatins became available, middle- and upper-class women increasingly adopted artificially-manufactured ingredients for cooking their foods. The introduction of packaged dyes not only made food coloring less time

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<sup>3</sup> For the history of the nineteenth-century ideal womanhood, see Nancy Cott, *The Bonds of Womanhood: "Woman's Sphere" in New England, 1780-1835* (New Haven: Yale University Press, 1977); Kathryn Kish Sklar, *Catharine Beecher: A Study in American Domesticity* (New Haven: Yale University Press, 1973); Maxine L. Margolis, *Mothers and Such: Views of American Women and Why They Changed* (Berkeley: University of California Press, 1984); Glenna Matthews, *"Just a Housewife": The Rise and Fall of Domesticity in America* (New York: Oxford University Press, 1987); and Barbara Welter, "The Cult of True Womanhood, 1820-1860," *American Quarterly* 18 (1966): 151-74.

consuming but also eliminated dye making from home cooking, representing a shift in the role of households from a site of production to consumption.<sup>4</sup> In the mid-twentieth century, as mass-produced products flooded into the American kitchen, food producers framed the artificiality of cake baking and food coloring with cake and frosting mixes as the hallmark of convenience and creative cooking, by advertising color as a way for women to individualize their dishes and express their aesthetic taste.

The advent of modern consumer culture from the early- to mid-twentieth century transformed not only the role of women but also the degree to which they accepted the artificiality of food products and cooking processes. How and to what extent women incorporated artificiality into their cooking depended on their social and economic status. By focusing on the coloring of foods and creation of decorative dishes at home mainly from the late nineteenth to the mid-twentieth century, this chapter explores ideology concerning gender, industrialization, and mass consumption, reflected in narratives about the color of foods and food coloring practices. It shows how ideas about femininity, refinement, and artificiality became closely intertwined. In making and eating colorful dishes, women accepted certain kinds of artificiality partly because artificiality provided them with convenience and

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<sup>4</sup> For the history of the increasing connections between commercial goods and women's work at home at the turn of the twentieth century, see Priscilla J. Brewer, *From Fireplace to Cookstove: Technology and the Domestic Ideal in America* (New York: Syracuse University Press, 2000); Ruth Schwartz Cowan, *More Work for Mother: The Ironies of Household Technology from the Open Hearth to the Microwave* (New York: Basic Books, 1983); Carolyn M. Goldstein, *Creating Consumers: Home Economists in Twentieth-Century America* (Chapel Hill: University of North Carolina Press, 2012); Matthews, "Just a Housewife"; and Susan Strasser, *Never Done: A History of American Housework* (New York: Pantheon, 1982).

partly because domestic advisers and food advertisers touted artificiality as a necessary element for the presentation of gender and class identity.

To examine the relationships between the color of foods and shifting ideas about femininity, class identity, and aesthetic taste, the chapter builds on Pierre Bourdieu's definition of taste as "an acquired disposition" to "establish and mark difference by a process of distinction."<sup>5</sup> By analyzing how food coloring practices and colorfully arranged foods symbolized the ideal femininity from the late nineteenth to the mid-twentieth century, the chapter illustrates the process of taste making and the embodiment of one's taste in household cookery.

Scholars of consumer culture, women's history, and food studies have shown the impact of industrialization on domestic cooking and women's active role not only within households but also as political and social actors, enriching our understanding of women's lives. Anthologies *Kitchen Culture in America* (2001) and *From Betty Crocker to Feminist Food Studies* (2005) provide crucial perspectives and frameworks for examining gender roles, the industrialization of a kitchen, women's role in the food business, and the relationships between cooking and gender identity.<sup>6</sup> In *Feeding the*

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<sup>5</sup> Pierre Bourdieu, *Distinction: A Social Critique of the Judgment of Taste*, trans. Richard Nice (Cambridge, MA: Harvard University Press, 1984).

<sup>6</sup> Arlene Voski Avakian and Barbara Haber, eds., *From Betty Crocker to Feminist Food Studies: Critical Perspectives on Women and Food* (Amherst: University of Massachusetts Press, 2005); and Sherrie A. Inness, ed., *Kitchen Culture in America: Popular Representations of Food, Gender, and Race* (Philadelphia: University of Pennsylvania Press, 2001). See also Amy Bentley, *Eating for Victory: Food Rationing and the Politics of Domesticity* (Champaign, IL: University of Illinois Press, 1998); Amy Bentley, *Inventing Baby Food: Taste, Health, and the Industrialization of the American Diet* (Berkeley: University of California Press, 2014); Elizabeth Engelhardt, *A Mess of Greens: Southern Gender and Southern Food* (Athens, GA: University of Georgia Press, 2011); Katherine J. Parkin, *Food Is Love: Advertising and Gender*

*Family*, sociologist Marjorie L. DeVault has shown “feeding” as a gendered task, which both rewards and oppresses women in families and in society.<sup>7</sup> Although DeVault’s focus is primarily on everyday meals rather than decorative dishes or frosted cakes made for special occasions, her analysis offers an insight into women’s role as “consumers” and “producers.”

Historians Laura Shapiro and Karal Ann Marling’s studies have illuminated the transformation of visibility in food consumption. Shapiro has explored the commercialization of foods and cooking processes and the role of domestic advisers in transforming American home cookery from the nineteenth- to the mid-twentieth century. Her studies also address the growing importance of vision over taste particularly in early-twentieth-century “scientific cooking.”<sup>8</sup> Marling’s work has delineated the dramatic transformation of visual culture in mass consumer society of the mid-twentieth-century United States.<sup>9</sup> This chapter has benefitted particularly from her analysis of *Betty Crocker Picture Cookbook* and corporate marketing that stressed the significance of visual appeal in promoting processed foods to female consumers. Drawing on these studies, I investigate how the rise of consumer culture changed not

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*Roles in Modern America* (Philadelphia: University of Pennsylvania Press, 2006); and Psyche A. Williams-Forson, *Building Houses out of Chicken Legs: Black Women, Food, and Power* (Chapel Hill: University of North Carolina Press, 2006).

<sup>7</sup> Marjorie L. DeVault, *Feeding the Family: The Social Organization of Caring as Gendered Work* (Chicago: University of Chicago Press, 1991)

<sup>8</sup> Laura Shapiro, *Something from the Oven: Reinventing Dinner in 1950s America* (New York: Penguin Books, 2004); and Shapiro, *Perfection Salad: Women and Cooking at the Turn of the Century* (New York: Modern Library, 2001).

<sup>9</sup> Karal Ann Marling, *As Seen on TV: The Visual Culture of Everyday Life in the 1950s* (Cambridge, MA: Harvard University Press, 1994).

only the ways women created colorful eye-appealing dishes but also their relationships with food, transforming visibility in home cooking.

### **Artificiality as a Luxury**

#### *Making Natural Dyes*

Artificiality in home cooking in the nineteenth century was a luxury limited to urban middle- and upper-class women, since how women colored foods depended on their social and economic status. The creation of colorful, elaborate foods required time, kitchen space, equipment, and expensive ingredients, including food dyes, most of which working-class households could not afford. Nor did lower-class women, many of whom were immigrants, have access to print media that provided advice on ideal American womanhood based on white upper-class ladies, due to language barriers and poverty.<sup>10</sup> Moreover, while housewives in the countryside could use fruits and vegetables for coloring foods, some food dyes were available primarily at druggists in urban markets.

The major sources of food colorings used at home were so-called “natural” dyes, extracted from fruits and vegetables including carrots, beets, and spinach. Saffron was another source of yellow coloring. Cochineal – dye made from an insect indigenous to Mexico – imparted bright red and pink shades to various dishes. Mid- to late-nineteenth-century cookbooks directed to use these colorings not only for

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<sup>10</sup> Katherine Leonard Turner, *How the Other Half Ate: A History of Working-Class Meals at the Turn of the Century* (Berkeley: University of California Press, 2014).



desserts, such as cake icing, candies, and jellies, but also for meat dishes, pickles, sauce, and soup. In 1840, for example, Eliza Leslie, a famous nineteenth-century cookbook author, suggested to “heighten the green” of asparagus soup by adding the juice of spinach.<sup>11</sup>

Domestic writers often mentioned saffron and cochineal as ideal sources for coloring foods. Leslie noted in her 1840 cookbook that “a few grains of saffron” would “improve the colour” of orange jelly “without affecting the taste.”<sup>12</sup> She recommended cochineal to give “a good red colour” to red cabbage pickle and to preserved quinces and apples. For cake decoration, Leslie asserted that cake would “look extremely well” with icing tinted with “pink by the addition of a little cochineal.”<sup>13</sup> In *Miss Beecher’s Domestic Receipt Book*, published in 1846, Catharine Beecher referred to cochineal for coloring candies and desserts.<sup>14</sup> The shades of cochineal and saffron were so intense that usually only a small amount was necessary for coloring food at one time. Hence the consistency of the food changed little; whereas fruit and vegetable juice tended to water down the food. Saffron and cochineal lasted a long time while fruit and vegetable colorings did not store well.<sup>15</sup>

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<sup>11</sup> Miss Leslie [Eliza Leslie], *Directions for Cookery, In Its Various Branches* (Philadelphia: E. L. Carey & Hart, 1840), 35-36.

<sup>12</sup> *Ibid.*, 244.

<sup>13</sup> *Ibid.*, 40, 248, 252, 339.

<sup>14</sup> Catharine Beecher, *Miss Beecher’s Domestic Receipt Book: Designed as a Supplement to Her Treatise on Domestic Economy* (New York: Harper, 1846), 172, 177.

<sup>15</sup> See Elizabeth F. Ellet, *The New Cyclopædia of Domestic Economy, and Practical Housekeeper* (Norwich, CT: Henry Bill Publishing, 1873), 347, 400-401; *The Good*

Both cochineal and saffron were expensive, however. Saffron had been an important global commodity since ancient times, worth more than its weight in gold (it is still a relatively expensive spice).<sup>16</sup> Cochineal had been very popular not only for food coloring but also for textile and art painting among European aristocrats and upper-class consumers since the Spanish conquest of central America in the sixteenth century.<sup>17</sup> Because of its beautiful vivid red shade and stability, cochineal became a profitable commodity for European settlers.<sup>18</sup> In the mid-nineteenth century, cochineal

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*Cook: Containing Eight Hundred First Rate Receipts* (New York: Philip J. Cozans, 1861), 122; and Maria Eliza Ketelby Rundell, *A New System of Domestic Cookery: Formed upon Principles of Economy, and Adapted to the Use of Private Families* (Boston: Andrews and Cummings, 1807), 30, 113, 119, 176.

<sup>16</sup> See Pat Willard, *Secrets of Saffron: The Vagabond Life of the World's Most Seductive Spice* (Boston: Beacon Press, 2001).

<sup>17</sup> For the history of the global trade of cochineal, see Amy Butler Greenfield, *A Perfect Red: Empire, Espionage, and the Quest for the Color of Desire* (New York: Harper Collins, 2005); Carmella Padilla and Barbara Anderson, eds., *A Red Like No Other: An Epic Story of Art, Culture, Science, and Trade* (New York: Skira Rizzoli, 2015); and Elena Phipps, *Cochineal Red: The Art History of a Color* (New Haven: Yale University Press, 2010).

<sup>18</sup> *The Art of Confectionery, with Various Methods of Preserving Fruits and Fruit Juices* (Boston: J. E. Tilton, 1865), 19. The production of cochineal was a labor-intensive process. After collecting the insects, which were usually bred on cactus, growers boiled them in water or dried them in the oven, then shipped to the market. The quality of cochineal dyes depended on the treatment of the insects: boiling in water, drying in the oven, or heating on a hot plate. When they were plunged into water, the dye became reddish brown and was partially deprived of a white dust which the living insect was covered with. The dyes were hence less valuable. Those insects dried in the oven assumed an ash gray color with some mottle. When spread on heated plates, their color turned to blackish red, traded as the highest quality dye.

was traded for about \$2 to \$2.50 per pound (\$63 to \$80 in 2014 dollars) in the New York market.<sup>19</sup>

The limited household budgets did not allow many middle- or working-class women to purchase cochineal or saffron. Leslie and Beecher offered recipes for less expensive coloring sources, usually plant-derived colors. Leslie recommended alkanet (red dye extracted from an herb called *alkanna*) since it was “much cheaper than cochineal” yet still imparted “a beautiful red colour” to foods. “You can purchase [alkanet] at any druggist’s, and at a trifling cost,” Leslie stated.<sup>20</sup> In her recipe for blanc mange, Beecher advised: “Color the blanc mange in separate parcels, red, with juice of boiled beets, or cochineal; yellow, with saffron; and blue, with indigo.”<sup>21</sup> Cookbook authors also suggested egg yolks and carrots as cheaper alternatives to saffron.<sup>22</sup>

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<sup>19</sup> “Life in a Fair Country,” *New York Times* (NYT), September 9, 1888. In the early nineteenth century, cochineal was even more expensive. In 1807, for instance, cochineal was traded for five dollars per pound (about \$106 in 2014 dollars) in the New York market. In the 1830s, cochineal prices began decreasing due to the expansion of production from Mexico to other regions. Jeremy Baskes, “Seeking Red: The Production and Trade of Cochineal Dye in Oaxaca, Mexico, 1750-1821,” in *The Materiality of Color: The Production, Circulation, and Application of Dyes and Pigments, 1400-1800*, eds. Andrea Feeser, Maureen Daly Goggin, and Beth Fowkes Tobin (Burlington, VT: Ashgate, 2012), 110-12; Samuel Dickinson and Alexander Ming, *Ming’s New-York Price-Current* (New York: Alexander Ming, 1807); and Greenfield, *Perfect Red*, 214-19.

<sup>20</sup> Eliza Leslie, *The Lady’s Receipt-Book: A Useful Companion for Large or Small Families* (Philadelphia: Carey and Hart, 1847), 250.

<sup>21</sup> Beecher, *Miss Beecher’s Domestic*, 177.

<sup>22</sup> See Maria Eliza Ketelby Rundell, *The Experienced American Housekeeper, or Domestic Cookery: Formed on Principles of Economy for the Use of Private Families* (Hartford, CT: Silas Andrus, 1829), 167.

Even these less expensive colorings were probably not part of household work for working-class women. Making dyes required time and labor. To make green dyes, fresh young spinach leaves were pounded, then twisted through a cloth into a stew-pan with a little salt. The juice was put on the fire to simmer, and when it was well curdled, water was strained off from the curd.<sup>23</sup> Likewise, making more expensive cochineal dye was a time-consuming process. Druggists sometimes powdered dried cochineal insects and sold them to customers, including professional confectioners and bakers, as well as housewives.<sup>24</sup> But in many cases customers purchased a bag of insects and pounded them to make dye. A typical recipe for cochineal dye called for one ounce of cochineal insects, one ounce of cream of tartar, two drachms (1/4 ounce) of alum, and half a pint of water.<sup>25</sup> After cochineal was pounded into fine powder, all the ingredients were boiled together until the water was reduced by half, for about half an hour. The liquid was strained through muslin and put up in a small bottle for use.<sup>26</sup>

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<sup>23</sup> *The Good Cook*, 101; and Leslie, *Directions for Cookery*, 333.

<sup>24</sup> C. & A. J. Langley Advertisement, *Sacramento Daily Union*, January 11, 1856.

<sup>25</sup> Drachm, or dram, was a unit of volume. One dram was 1/8 of a fluid ounce.

<sup>26</sup> For cochineal dye recipes, see Ellet, *The New Cyclopædia*, 225, 342, 475-76; Charles H. King, *Cakes, Cake Decorations, and Desserts: A Manual for Housewives* (Philadelphia: Arnold, 1896), 45; Elizabeth Ellicott Lea, *Domestic Cookery, Useful Receipts, and Hints to Young Housekeepers* (Baltimore: Cushing & Brothers, 1845), 108; Eliza Leslie, *Seventy-Five Receipts for Pastry, Cakes, and Sweetmeats*, 4th ed. (Boston: Munroe and Francis, 1832), 48, 102; Leslie, *The Lady's Receipt-Book*, 250; D. A. Lincoln, *Mrs. Lincoln's Boston Cook Book* (Boson: Roberts brothers, 1884), 381-82; Rundell, *A New System*, 30; Rundell, *The Experienced American Housekeeper*, 167; and *The Kitchen Directory and American Housewife* (New York: Ivison & Phinney, 1858), 144.

Although working-class women did not have time or money to make elaborate dishes for their own households, their cooking skill and labor were important part of the creation of colorful dishes in upper-class families. In a nineteenth-century popular discourse, colorfully ornamented foods symbolized upper-class femininity.<sup>27</sup> The actual making of delicate desserts, however, was often the work of servants. In fact, in many mid- and late-nineteenth-century cookbooks, one of the issues often discussed was, besides cooking, how to educate servants.<sup>28</sup>

During the last several decades of the nineteenth century, the invention of synthetic dyes for the textile industry helped expand the variety of food colors available to middle-class consumers. For example, as French chemists created one of the earliest synthetic red dyes, called fuchsine, for textile and paint colors in 1859, textile dyers replaced cochineal and other natural dyes with synthetic ones, which were much less expensive and more stable.<sup>29</sup> Consequently, by the late 1880s, the retail price of cochineal had decreased to fifteen to twenty cents per pound (about five

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<sup>27</sup> See *The Art of Confectionery*, 13; and Catherine Owen, "Home-Made Christmas Confection: Dainty Work for Fairy Fingers," *Good Housekeeping (GH)* 2, no.4 (December 26, 1885): 101-102.

<sup>28</sup> See for instance Beecher, *Miss Beecher's Domestic*; and Leslie, *The Lady's Receipt-Book*. For the history of domestic servants, see Rebecca Sharpless, *Cooking in Other Women's Kitchen: Domestic Workers in the South, 1865-1960* (Chapel Hill: University of North Carolina Press, 2010); and Daniel E. Sutherland, *Americans and Their Servants: Domestic Service in the United States from 1800 to 1920* (Baton Rouge: Louisiana State University Press, 1981).

<sup>29</sup> Greenfield, *Perfect Red*, 228.

dollars in 2014 dollars).<sup>30</sup> Since synthetic dyes were not yet available for food use, natural dyes, including cochineal, continued to be the main source of food coloring. (Saffron remained to be an expensive spice and food color throughout the nineteenth and twentieth centuries.)

The use of cochineal had become not only less expensive but also more convenient by the 1870s. Druggists began supplying “prepared cochineal” – among the earliest commercially prepared food colorings – for a few cents a bottle. It was usually a liquid, which contained cochineal insects poured into alcohol (sometimes synthetic dyes were added to the solution).<sup>31</sup> There was no longer a need for housewives to pound the insects or boil them for more than half an hour, as they could use the prepared cochineal solution straight from the container. Nonetheless, housewives still needed to extract juice from fruits and vegetables when they needed green, yellow, and other colors.

With cochineal dye making no longer a part of domestic cooking, many late-nineteenth-century recipes mentioned simply “a few drops of prepared cochineal” when red or pink color was necessary, without any directions on how to make the dye.<sup>32</sup> Marion Harland’s *Common Sense in the Household*, originally published in

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<sup>30</sup> “Life in a Fair Country.” See also “The Cochineal Industry in Guatemala,” *American Druggist* 15, no. 5 (May 1886): 96; and “The Practical Value of Science,” *Pacific Rural Press*, November 27, 1875.

<sup>31</sup> “Crumbs,” *GH*, April, 1894, 193; and Chas. Scranton, “Candy Making Recipes,” *Ladies’ Home Journal (LHJ)*, November 1899, 16. See also Mary Barrett Brown, “Four Savory Entrées,” *LHJ*, December 1894, 25; Catherine Owen, “Fine Cakes,” *GH*, February 18, 1888, 187; Mary J. Safford, “Ways of Serving Strawberries,” *LHJ*, May 1896, 26; “Suggestions for Mothers,” *LHJ*, August 1895, 27.

<sup>32</sup> Most recipes that included cochineal prior to the late 1880s usually mentioned the amount of cochineal by weight, such as “ounce” or “grains” (0.023 ounce), indicating

1871, called for “prepared cochineal” for coloring marbled cake and jelly desserts.<sup>33</sup> In her 1875 cookbook, Harland contended that although readers could use strawberry or currant juice for coloring cakes, cochineal was “much better” since it took “only a few drops to color the whole cake.” Cochineal had no taste or odor and it was “perfectly harmless,” added Harland.<sup>34</sup> Since the 1870s, an increasing number of newspapers also began featuring recipes that called for cochineal. In 1875, for instance, a farm newspaper *Pacific Rural Press* printed a recipe for orange jelly colored “with prepared cochineal.”<sup>35</sup> Although it was still a luxury for working-class households, cookbooks, newspapers, and women’s magazines served to promote the use of cochineal, as well as other food colorings, among middle- and upper-class women.

#### *Creating “Dainty” Dishes*

Food coloring and decoration based on a color scheme became an important part of cooking among middle- and upper-class households in the late nineteenth century. The term “dainty” was one of the most-often used adjectives in cookbooks, women’s magazines, and food advertisements for describing ornamental, delicate, and light dishes, including tea sandwiches, salads, decorated cakes, and gelatin desserts

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that cochineal was purchased and used in a solid or powdered form. These recipes usually explained how to make cochineal dyes.

<sup>33</sup> Marion Harland, *Common Sense in the Household: A Manual of Practical Housewifery* (1871; repr., New York: Scribner, Armstrong, 1873), 324, 443.

<sup>34</sup> Marion Harland, *Breakfast, Luncheon and Tea* (New York: Scribner, Armstrong, 1875), 328.

<sup>35</sup> “Domestic Economy,” *Pacific Rural Press*, February 20, 1875. See also “Answers,” *NYT*, April 2, 1876; “Domestic Recipes,” *Pacific Rural Press*, February 4, 1871; and “Domestic Economy,” *Pacific Rural Press*, December 9, 1882.

(Fig.20).<sup>36</sup> According to the Oxford English Dictionary (OED), the meaning of “dainty” includes “pleasing to the palate,” while it also means the delicate disposition of persons as well as something valuable, pleasant, and delightful. One of the earliest usages of “dainty” in association specifically with foods appeared in Chaucer’s *Canterbury Tales*: “to gete a glotoun deyntee mete and drinke.”<sup>37</sup> The OED does not indicate that the term bears, or has borne, a gendered connotation. Yet in the late-nineteenth-century United States, popular media, particularly cookbooks and women’s magazines, began using “daintiness” to describe delicate and light dishes and desserts, associated with femininity. (Under this specific usage, what Chaucer described was far from “dainty” foods.)

As the middle-class population expanded and a variety of foods became increasingly available in the late nineteenth century, cookbooks, women’s magazines, and advice books presented daintiness as the ideal taste that middle-class women should aspire. The creation of ornamental desserts and the coloring of foods became important part of the construction of class as well as gender identity.<sup>38</sup> Popular media

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<sup>36</sup> Sherrie A. Inness, *Dinner Roles: American Women and Culinary Culture* (Iowa City: University of Iowa Press, 2001), 58; and Shapiro, *Perfection Salad*, 96-97.

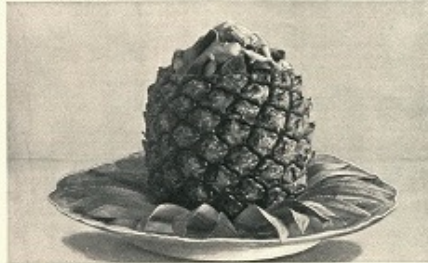
<sup>37</sup> Oxford English Dictionary, s.v. “dainty,” accessed January 20, 2016, <http://www.oed.com>.

<sup>38</sup> For the construction of “middle class,” see Stuart M. Blumin, *The Emergence of the Middle Class: Social Experience in the American City, 1760-1900* (New York: Cambridge University Press, 1989); Cott, *The Bonds of Womanhood*; Lori D. Ginzberg, *Women and the Work of Benevolence: Morality, Politics, and Class in the Nineteenth-Century United States* (New Haven: Yale University Press, 1990); and Mary P. Ryan, *Cradle of the Middle Class: The Family in Oneida County, New York, 1790-1865* (New York: Cambridge University Press, 1981).



## SOME DAINY FRUIT DESSERTS FOR THE SUMMER TABLE

*With Photographs Prepared for the Boston Cooking School Magazine,  
by whose Courtesy this Article is Published in  
The Ladies' Home Journal*



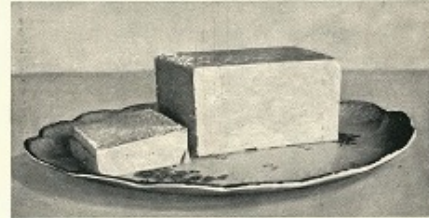
**PINEAPPLES AND ORANGES** half frozen make a delicious dessert. Cut the top off a pineapple, place over the bottom, so that it may stand firm. With a knife remove the sides and take it with the apex of three oranges, arranged in a fruit jar, and pack in ice and salt for two hours. When ready to serve, turn the mixture into the pineapple, and garnish the base.



**DELICIOUS BUCHARDT RELEY** may be made by cutting chocolate into pieces as thick as half an inch, and then placing it in a dish with a cupful of cream, one of whites, a little sugar and salt, and some food coloring, and the mixture is beaten. Put some pink coloring in some of the cream, and mix with the chocolate and the juice of a lemon. Pour into a mold, and chill. Sprinkle with whipped cream.



**FRESH CHERRY SOUP.** Put a cupful of cherry juice and water and a cupful of sliced cherries over the fire. Mix three tablespoonfuls of cornstarch, stir into the cherry mixture. Cook for ten minutes. Add the juice of half a lemon and the whites of four eggs. Decorate with marshmallows with cherries, and in the middle, set in a garnish of hot water, and lemon. Serve with cream and sugar.



**A DAINY PEACH MOUSSE** is made by making one teaspoonful of gelatin in cold water, dissolving it over hot water, and straining it into the pulp of a peach, and add the juice of half a lemon. With a few drops of cream, and mix the peach mixture to a cup of the cream, and mix to thicken, then fold into the cream. Pour into a mold, cover tightly and pack in ice and salt.



**GATEAU ST. HONORE WITH STRAWBERRIES** is made by placing a circular piece of puff paste upon a buttered sheet. Place two rows of cherries upon the edge of the puff paste. Cook for ten minutes. Add the juice of half a lemon and the whites of four eggs. Decorate with marshmallows with cherries, and in the middle, set in a garnish of hot water, and lemon. Serve with cream and sugar.



**GRAPE JUICE FRAPPÉ** is made by boiling one quart of water and two cupfuls of sugar for ten minutes, straining into the cup of the freezer, and when cold add a pint and a half of grape juice and the juice of two lemons. Pour the mixture with ice and rock salt. When the mixture is half frozen remove the dashes, and set aside until serving time. Serve in cups.



**A DISH OF BANANA CHARLOTTE.** Soak the pulp of several bananas in cream and strain into the pulp, adding lemon juice. Set the mixture into a pan of ice water, and before it begins to set, add in the cream whites of eggs. Line a mold with slices of banana, coat the bottom with ice, and when it has become chilled, turn out and garnish with slices of whipped cream.



**STRAWBERRY BOMBE GLACÉE.** A delicious summer dessert, is made by taking a mould with a strawberry sheet, and pouring into the centre a mixture made from the whites of eggs, prepared with sugar and cream, beaten stiff and flavored with vanilla, and then covering the cream mixture with the sheet and the mould is set. Pack in ice and salt, and serve after it has stood for three hours.

Figure 20 "Some Dainty Fruit Desserts for the Summer Table." *Ladies' Home Journal*, July 1899.

used “dainty” not only for foods but also for the proper characteristics of genteel women themselves. It also referred to ladylike objects such as lace and lingerie.<sup>39</sup> Men who liked visually appealing dainty foods were regarded as effeminate.<sup>40</sup>

Daintiness was closely associated with visuality, since ornamental, colorful food was the essential feature of dainty dishes. Hence “dainty” foods meant not only the OED definition of “pleasing to the palate” but also pleasing to the eye. An 1890 article in the *Ladies’ Home Journal* contended that “by the exercise of a little good taste and ingenuity,” dishes which were “so exceedingly dainty-looking” could make the table “wear a most tempting aspect.” “When the various colors [were] skillfully intermixed, and the flavors pleasantly varied,” argued the author, “the result [was] something quite delightful both as regards the palate and the eye.”<sup>41</sup> The *Boston Cooking School Magazine* similarly insisted that if food delighted the eye, it was “more certain to delight the palate also.”<sup>42</sup> The stimulation of the palate and gustatory sensations through the eye was essential for middle- and upper-class cookery. In the late nineteenth-century, home economists promoted the ideal image of ladies who were not overly attracted solely to the taste of food.<sup>43</sup>

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<sup>39</sup> Inness, *Dinner Roles*, 53-55; and Shapiro, *Perfection Salad*, 87, 92.

<sup>40</sup> Harvey Levenstein, *Paradox of Plenty: A Social History of Eating in Modern America* (Berkeley: University of California Press, 2003), 35.

<sup>41</sup> Mary Barrett Brown, “Notes on European Cookery: Superior Cold Sweets,” *LHJ*, August 1890, 21.

<sup>42</sup> “From Various Sources,” *Boston Cooking School Magazine of Culinary Science and Domestic Economics (BCS)*, October 1, 1898, 190.

<sup>43</sup> Levenstein, *Paradox of Plenty*, 35; and Shapiro, *Perfection Salad*, 68, 78, 96-97.

The arrangement of foods based on color schemes was essential for creating decorative dishes and presenting women's aesthetic taste. A recipe for lobster salad, featured in the 1898 *Boston Cooking School Magazine*, was carefully composed of different shades (Fig.21): "The vivid color of the shells, in pleasing contrast with the delicate heart leaves of lettuce, together with the yellow of the mayonnaise, put on in ornamental stars, makes this a very showy dish."<sup>44</sup> Domestic advisers also recommended that middle- and upper-class women serve color coordinated meals. The entire table was themed after one color, such as a red dinner or a white luncheon. A recipe for a "green color luncheon" could include cucumbers, asparagus loaf, watercress-and-egg salad, and white cake with pistachio decorations.<sup>45</sup> These color-coordinated menus appeared in magazines and cookbooks not only for special

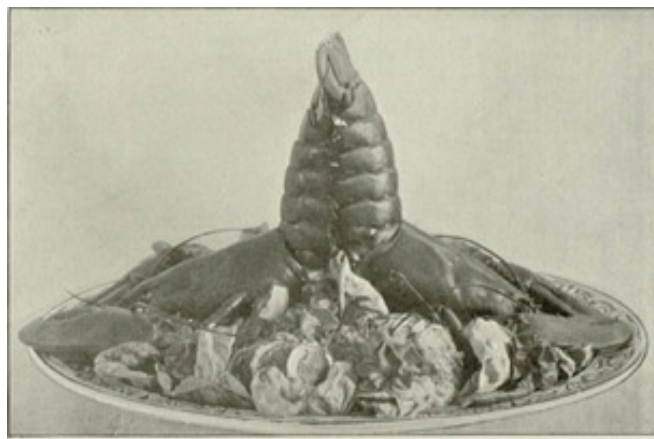


Figure 21 "Lobster Salad." *Boston Cooking School Magazine*, August 1898.

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<sup>44</sup> "Recipes Used in Preceding Menus," *BCS*, August 1898, 95.

<sup>45</sup> "Seasonable Menus for Easter Wee," *BCS*, April 1900, 284. See also Eleanor M. Lucas, "June Luncheons," *BCS*, June 1900, 3-6; "Menus Illustrative of Class Work," *BCS*, August 1897, 95-97; and "News and Notes," *BCS*, February 1899, 277-78.

occasions like Christmas and Easter, but also for regular meals. Women were encouraged not only to cook color-themed dishes but also to decorate the dining table, and sometime the entire dining room, to suit the color theme.<sup>46</sup>

Cookbook writers introduced a variety of colorful desserts, including yellow and orange colored gelatin molds and green colored blanc mange, throughout the nineteenth century. But the color of cake frostings was predominantly white until the turn of the twentieth century. The exception was a light pink shade.<sup>47</sup> White and pink frostings were relatively easy to make and store. Recipes for white icing required primarily egg whites and sugar.<sup>48</sup> For the pink color, women had to go through several additional steps. But since cochineal dyes could be stored for long time, they did not have to make the color every time they made pink icing. Moreover, during the 1870s and 1880s, prepared cochineal was the only commercially prepared color available on the market. In contrast, making green colors from fresh spinach took time and the extract did not last long. Saffron for yellow was relatively expensive compared to other ingredients.

In addition, white and light pink were the shades that domestic advisers promoted as the ideal female taste. Although some cookbooks included other colors, including yellow, blue, and green, for icing, these recipes stressed the significance of

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<sup>46</sup> Shapiro, *Perfection Salad*, 79.

<sup>47</sup> See for instance *American Housewife and Kitchen Directory* (New York: Dick and Fitzgerald, 1869), 62; Ellet, *The New Cyclopædia*, 475-76; King, *Cakes, Cake Decorations*, 45; and Lincoln, *Mrs. Lincoln's* (1884), 381-82

<sup>48</sup> Beecher, *Miss Beecher's Domestic*, 133; Lea, *Domestic Cookery*, 84; Lincoln, *Mrs. Lincoln's* (1884), 384-85; and Rundell, *A New System*, 212.

using light shades.<sup>49</sup> “Heavy colors are not the correct thing in icings, and are objectionable to many people,” contended the author of a 1896 confectionery cookbook.<sup>50</sup> Lighter shades were preferable not only for cake icings but also for other confections. In an 1898 food column in the *Ladies’ Home Journal*, a home economist declared that “ice cream may be colored blue, but I cannot imagine that blue ice cream would be even artistic.” The author advised to “keep foods their natural color.”<sup>51</sup> Likewise, the *Boston Cooking School Magazine* asserted that readers should color ice cream “very delicately.”<sup>52</sup>

How light the shade of food should be and how much dye should be added were difficult to discern, however. In an 1888 *Good Housekeeping* column, responding to an inquiry from a reader about how much cochineal was required “to make a pretty coloring for icing,” the editor stated: “It is quite impossible to give the quantity of cochineal, use it drop by drop, stirring the while until the tint is attained.”<sup>53</sup> The quantity of dye needed for coloring food depended on various factors, including the strength of the dye, the kind of food, and the preference of cooks and diners. There was no clear criterion. The lightness of shades, as well as knowledge about how much

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<sup>49</sup> *American Housewife*, 62; Ellet, *The New Cyclopædia*, 475-76; Fannie Merritt Farmer, *The Boston Cooking-School Cookbook* (Boston: Little, Brown, 1896), 291; Harland, *Common Sense*, 314; Leslie, *Directions for Cookery*, 339; and “Queries and Answers,” *BCS*, October, 1897, 183.

<sup>50</sup> King, *Cakes Cake Decorations*, 40.

<sup>51</sup> “Mrs. Rorer’s Answers to Questions,” *LHJ*, August 1898, 32

<sup>52</sup> Eleanor M. Lucas, “With Peaches In,” *BCS*, August, 1898, 70.

<sup>53</sup> “The Cozy Corner,” *GH*, July 7, 1888, 115. See also “The Cozy Corner,” *GH*, June 9, 1888, 68.

dye should be added to food, hence served to represent middle- and upper-class women's aesthetic taste and cooking skill.

Ornamental cooking and color-coordinated meals indicated not only women's taste for colorful decorative dishes but also their ability to control foods and create orderly arrangements on the table. An 1897 recipe, featured in the *Boston Cooking School Magazine*, claimed: "Whipped cream should always be served with sliced peaches, to hide the discolorations that cannot be prevented."<sup>54</sup> Until well into the early twentieth century, the procurement and cooking of foods were largely guesswork. Without refrigeration systems for transporting and storing perishable foods, it was difficult for housewives, as well as for grocers, to maintain the quality of fruits and vegetables, including their colors. Without government grading standards or national marketing systems, the supply of perishables was not reliable and their quality and availability depended on regions, climates, and seasons. Whipped cream, sauces, and food colorings were important means for women to cope with natural varieties and deficiencies and create dishes pleasing to the eye.<sup>55</sup>

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<sup>54</sup> "Household Hints," *BCS*, August, 1897, 130. See also Lincoln, *Mrs. Lincoln's* (1884), 305.

<sup>55</sup> For the popularity of white sauce in late-nineteenth-century cooking, see Shapiro, *Perfection Salad*, 80, 87. For the transformation of food distribution and marketing, see Harvey Levenstein, *Revolution at the Table: The Transformation of the American Diet* (Berkeley: University of California Press, 2003); and Waverley Root and Richard de Rochemont, *Eating in America: A History* (New York: William Morrow, 1976).

## The Proliferation of “Artificial” Ingredients

### *The Introduction of Commercial Dyes and Gelatins*

As packaged dyes were introduced for household use during the 1890s, they afforded middle- and upper-class housewives a means for coloring foods conveniently while standardizing the shades that women imparted to their dishes. Commercial food colors were not only a time-saver for housewives but also generally less expensive than cochineal and saffron, and more economical than fruit- and vegetable-colors. As packaged dyes were usually more intense than homemade food colorings, only a small quantity of dye gave food a desirable shade. In addition, factory-made colors were more uniform. By trying out packaged dyes several times, women were able to get a sense of how much color they needed in order to create a certain shade. On the other hand, it was likely that the intensity and overall quality of fruit and vegetable dyes differed almost every time women made them. It was much more difficult for them to predict the amount of coloring to be added until they actually poured dyes into food, and they needed to guess the amount of color needed every time they used it.

The Joseph Burnett Company was one of the earliest manufacturers of packaged food colorings for home consumption. Druggists Joseph Burnett and Theodore Metcalf established the Metcalf and Burnett Chemical Company in Boston in 1845, and manufactured a variety of chemical products, including medical supplies. After Burnett developed a vanilla extract for flavoring foods upon a customer's request in 1847, the firm began focusing on the food extract business.<sup>56</sup> In the

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<sup>56</sup> George H. Burnett, “Winning Nationally against 6,000 Local Producers,” *Printers' Ink* 81, no. 9 (November 1912): 3-4; and Joseph Burnett Company (JBC), *About Vanilla* (Boston: Joseph Burnett Company, 1900).

American market, the only commercial extract available at the time was an extract of lemon. Although some professional chefs had used the vanilla bean, it was time consuming to extract vanilla flavoring. Burnett developed extracts of vanilla, as well as other flavors, including lemon, almond, rose, nutmeg, peach, celery, cinnamon, cloves, nectarine, ginger, and orange. By the late 1850s, the firm's extract business had expanded rapidly and Burnett moved the company to a larger Boston facility to increase its vanilla extract production. He sold off his share in the Metcalf Company to his partner in 1855, and two years later established the Joseph Burnett Company as a vanilla extract manufacturer.<sup>57</sup>

In the mid-1890s, after Joseph Burnett's death, his three sons inherited the company. Recognizing the increasing popular interest in fancy cooking, the Burnett brothers introduced "Burnett's Color Pastes" to the market (Fig.22).<sup>58</sup> By 1900, the

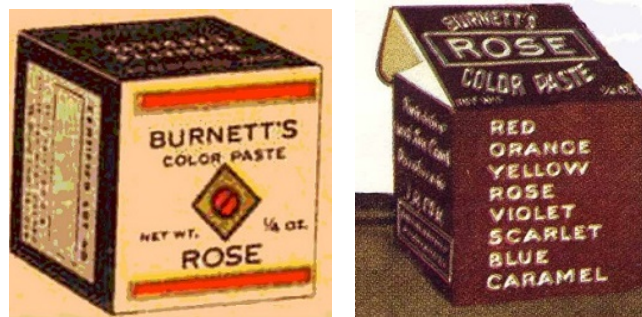


Figure 22 Joseph Burnett Color Pastes, c.1900. Southborough Historical Society, Southborough, MA.

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<sup>57</sup> "History of the Joseph Burnett Company," Southborough Historical Society, July 17, 2014, accessed October 21, 2015, <http://www.southboroughhistory.org/history-of-joseph-burnett-company.html>.

<sup>58</sup> Ibid.



Joseph Burnett Company had provided eight different shades of food colorings: leaf green, mandarin orange, fruit red, golden yellow, damask rose, violet, caramel, and chestnut.<sup>59</sup> One-ounce jars of color paste were available at grocery stores, and usually sold at about ten cents each.<sup>60</sup> Later in the 1930s, the company introduced food colorings not only in pastes but also in liquid and tablet forms.<sup>61</sup> Yet color pastes were generally preferable to tablet or liquid colors. Paste colors did not change the consistency of food to be colored while liquid colors slightly watered it down. In addition, pastes were generally stronger and deeper as they were more concentrated.<sup>62</sup>

To color foods, the paste was first mixed with a portion of materials to be colored. After the paste was thoroughly mixed, the colored portion was mixed with the rest of the material. It was important to add a shade a little deeper than the desired color; otherwise the color of the finished product tended to be too pale.<sup>63</sup> To tint hues different from the regular colors, consumers could mix different pastes together.

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<sup>59</sup> Burnett's Color Pastes Advertisement in *About Vanilla*. By 1915, these color names were changed to Orange, Blue, Caramel, Red, Rose, Green, Yellow, Scarlet, Chestnut, and Violet.

<sup>60</sup> JBC, "Dainty and Artistic Desserts: With Menus and Special Recipes by Mrs. Janet M. Hill" (1915): 40; and JBC, "Sixteen Recipes" (1915): 4. See also Eldridge Baker Company, *Wholesale Grocery Catalog* (October 1915; and October 1916), box 6, "Food," Warshaw Collection of Business Americana, circa 1724-1977, National Archives, National Museum of American History (NMAH), Washington D.C.

<sup>61</sup> JBC, "Rounding out the Meal: My Favorite Desserts by Born Cook" (1935).

<sup>62</sup> JBC, "Dainty and Artistic Desserts," 4. See also McKinley Wilton and Norman Wilton, *The Homemaker's Pictorial Encyclopedia of Modern Cake Decorating* (Whitefish, MT: Literary Licensing, 1954), 30.

<sup>63</sup> JBC, "Dainty and Artistic Desserts," 4; and JBC, "Dainty Desserts and Confections" (1914): 4.

Vermilion, for instance, could be made by adding red to scarlet.<sup>64</sup> In teaching consumers various combinations, the Joseph Burnett Company indicated the almost infinite possibilities of creating hues, while also encouraging them to purchase several jars at a time.

Commercial gelatins also transformed many aspects of cookery in the late nineteenth century, especially the making of visually-appealing dainty dishes. Packaged gelatins made it much easier to obtain gelatin aesthetically pleasing and palatable to the taste. Prior to the introduction of these products, cookbooks instructed how to make gelatin, usually extracted from calf's feet. Calf's feet were boiled in water for six or seven hours to release a jelly, and whites of eggs were added to the pot to clarify the extract. It was then strained through a flannel bag.<sup>65</sup> It was extremely important to make the gelatin clear and sparkling; otherwise "much of its beauty [was] destroyed."<sup>66</sup> Yet, unlike commercial products, home-made gelatin often assumed yellowish shades and an earthy smell, derived from calf's feet.<sup>67</sup> Gelatin dishes, which required a great deal of time and labor, indicated wealth and status. Neither working- nor middle-class women generally had time to spend more than five hours to make delicate gelatin desserts, which probably did not fill the stomachs of family members.

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<sup>64</sup> JBC, "Dainty Desserts," 4.

<sup>65</sup> Leslie, *Directions for Cookery*, 329; Leslie, *Seventy-Five Receipts*, 36; and Sanderson, *Cook and Confectioner*, 165. See also *American Housewife*, 111-12; *The Kitchen Directory*, 112, 144; Lea, *Domestic Cookery*, 163; Rundell, *The Experienced American*, 162; and Rundell, *A New System*, 252.

<sup>66</sup> Mary Foster Snider, "Aspic Delicacies," *GH*, February, 1904, 207.

<sup>67</sup> Wendy A. Woloson, *Refined Tastes: Sugar, Confectionery, and Consumers in Nineteenth-Century America* (Baltimore: Johns Hopkins University, 2002), 214.

In the late 1880s, as commercial gelatin was introduced by a number of manufacturers, including Nelson, Cox, and Knox, it became a popular ingredient for desserts as well as for main and side dishes. It still needed to soak half an hour or longer before it could be used, since commercial gelatin was available only shredded or in sheets. In 1894, Knox introduced “Sparkling Granulated Gelatine,” which women could readily use for cooking. Following Knox’s development, other gelatin manufacturers began introducing powdered products.<sup>68</sup> Cookbooks now rarely called for “calf’s-feet jelly.” Instead, they simply listed “box of gelatin” in ingredient sections. The revised edition of *Mrs. Lincoln’s Boston Cook Book*, published in 1903, noted in its preface that “since granulated gelatine [*sic*] and baking powder are now so universally used, the proportions of each are given where needed.”<sup>69</sup> Powdered gelatin, along with baking power, was one of the earliest “convenient” food products that transformed cooking methods and ingredients.

Most of these commercial gelatins were unflavored and uncolored. Gelatin makers touted transparency as a proof of purity and high quality. In its 1899 advertisement, Knox stressed that its product was “clear and sparkling.”<sup>70</sup> Yet clear gelatin required women to add flavors and colorings to make colorful desserts, aspic,

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<sup>68</sup> Shapiro, *Perfection Salad*, 93; and Woloson, *Refined Tastes*, 214.

<sup>69</sup> D. A. Lincoln, *Mrs. Lincoln’s Boston Cook Book*, rev. ed. (Boson: Roberts brothers, 1903), vii. Mrs. Lincoln recommended specific gelatin brands in her cookbook. For instance, the 1890 edition mentioned Cox’s and Nelson’s gelatin, while the 1896 edition included Knox’s product, as well as Cox’s and Nelson’s. In the 1909 and 1916 edition, only Cox and Nelson were mentioned.

<sup>70</sup> Knox Advertisement, 1899, box 5, Roy Lightner Collection of Antique Advertisements, David M. Rubenstein Rare Book & Manuscript Library, Duke University Durham, NC.

and salads. While the majority of gelatin makers supplied only clear gelatin, Knox began enclosing a packet of flavors and food dyes in a box of gelatin. By 1900, the firm had supplied two varieties of gelatin products: “No.1 Plain” and “No.3 Acidulated.” Both No.1 and No.3 enclosed, under a separate cover, powdered gelatins and pink food dyes, which could be “used to give a delicate pink tint to a dish.”<sup>71</sup> The No.3 variety, which Knox called “the busy housekeeper’s package,” included a small envelope of fruit acids, as well as pink dyes. The acids could be used as a substitute for orange or lemon juice for flavoring the finished product. A certain amount of acid or fruit juice was crucial for creating the fruit flavor for gelatin molds.<sup>72</sup> As there was no commercial orange or lemon juice on the market at the time, housewives needed to extract juice from the fruits to flavor their gelatin. The packet of fruit acids and pink dyes enabled “busy housewives” to bypass the processes of extracting juice and making food dyes.

The Genesee Pure Food Company of LeRoy, New York, eliminated even the process of adding flavors or colorings. The firm introduced gelatin products mixed with flavors and colors, which would become one of the iconic American food products – Jell-O. It was not the first pre-colored gelatin product to be invented. In 1845, engineer Peter Cooper patented gelatin desserts, which contained flavors and

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<sup>71</sup> Janet McKenzie Hill, “Dainty Desserts for Dainty People: Salads and Savories,” 1901, box 29, Culinary Catalog Collection, 1965-2000, Schlesinger Library, Radcliffe Institute, Harvard University, Cambridge, MA.

<sup>72</sup> Rosemarie D. Bria, “How Jell-O Molds Society and How Society Molds Jell-O: A Case Study of an American Food Industry Creation” (PhD diss., Columbia University, 1991): 44.

colors, but he did not venture into commercializing his invention.<sup>73</sup> A few decades later, Pearle B. Wait, a cough syrup manufacturer in LeRoy, developed a gelatin product with raspberry, lemon, orange, and strawberry flavors, and named his products Jell-O. Primarily due to a lack of publicity, the Jell-O business was not profitable. In 1899, Wait sold his rights to Orator Francis Woodward, president of the Genesee Pure Food Company, for \$450.<sup>74</sup>

Genesee's Jell-O business was slow at first, but with the firm's extensive marketing, the product began appealing to many American women. By the end of 1906, Jell-O sales had reached \$1 million.<sup>75</sup> During the mid-1900s, Genesee introduced chocolate, cherry, and peach flavors for ten cents per package, as well as Jell-O Ice Cream Powder in four flavors at twenty-five cents for two packages.<sup>76</sup> In coloring the products, the firm had initially used natural dyes, mainly vegetable colors. As the U. S. Department of Agriculture (USDA) approved seven synthetic dyes as safe for food use in 1907, the firm began using some of the certified colors for Jell-O.<sup>77</sup>

The luscious colors, varieties, versatility, and convenience were well suited to many young, inexperienced housewives' demands for making dainty dishes with less

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<sup>73</sup> Peter Cooper, "Improvement in the preparation of portable gelatine," US Patent 4,084, June 20, 1845.

<sup>74</sup> Bria, "How Jell-O Molds," 32. See also Carolyn Wyman, *Jell-O: A Biography* (New York: Harcourt, 2001), 3.

<sup>75</sup> Diane J. Nelson, "Jell-O Advertising in *Ladies' Home Journal*, 1902-1929" (PhD diss., Iowa State University, 1989): 26.

<sup>76</sup> *Ibid.*, 25.

<sup>77</sup> By the early 1930s, most coloring matters used for Jell-O were synthetic dyes, certified by the USDA. Bria, "How Jell-O Molds," 42-43.

time and less cost, appealing especially to urban middle-class women who could not get immediate help from their mothers and relatives (Fig.23). In its 1915 brochure,

CHERRY JELL-O

ORANGE JELL-O

LEMON JELL-O  
SPANISH SALAD

STRAWBERRY JELL-O

CHOCOLATE JELL-O

RASPBERRY JELL-O

# JELL-O

The beautiful dishes shown on this page are all made of Jell-O. Nothing just like them has ever been made of anything else.

The Orange Jell-O dessert could have been made without the fruit and whipped cream and still have been a perfect Orange dessert, for Jell-O has the true fruit flavor.

Lemon Jell-O is used as much for salads as for desserts, and the Spanish salad at the left is only one of dozens fully as good.

All the year round Strawberry Jell-O is wonderfully popular—with fruit in it when plentiful, and alone when fruit is scarce.

For a Chocolate pudding don't overlook the fact that the most perfect one can be made of Chocolate Jell-O.

Such raspberry desserts as the one shown below, and dozens of others, are to be had regardless of season, for Raspberry Jell-O furnishes them in delicious flavor.

The Jell-O Book tells all about these things and many more. If you will send your name and address it will be mailed to you promptly—free, of course.

Pure fruit flavors only are used in making Jell-O. All grocers carry the six different flavors in stock, and sell them two for 25 cents.

THE GENESEE PURE FOOD COMPANY  
Le Roy, N. Y., and Bridgeburg, Ont.

Figure 23 Jell-O advertisement. *Ladies' Home Journal*, 1911.

Genesee stressed the visual appeal that Jell-O brought to the dining table as well as its economic benefit: “There is always something festive looking about Jell-O. At a cost of a few cents it brings with it beauty of form and color, with which hardly another dessert can compete.”<sup>78</sup> Making colorful delicate desserts was no longer a time-consuming process. Nor did it require special skill or knowledge about food colorings. Manufacturers of commercial gelatins, particularly of pre-colored and pre-flavored Jell-O, marketed their products to middle-class housewives as a convenient and ideal way for presenting their taste for daintiness.

### *Food Color and Working-Class Femininity*

The introduction of less expensive, convenient packaged food dyes did not necessarily dissolve class differences with respect to food coloring. Commercial food dyes were no longer beyond the reach of lower-class women: a one-to-two ounce bottle of food dye was available for ten to fifteen cents.<sup>79</sup> According to historian Katherine Leonard Turner, the food budget of working-class New York City families in the 1900s was around ten dollars per week, and they spent ten cents for a can of tomatoes and four or five cents for a loaf of regular white bread.<sup>80</sup> Even within their tight budgets, they might have been able to buy a ten-cent bottle of commercial food dye, especially because those colorings usually lasted long time. In addition, food

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<sup>78</sup> Genesee Pure Food Company, “Jell-O” (1915). See also “Jell-O: America’s Most Famous Dessert,” box 7, Product Cookbooks Collection, 1874-1990, Archives Center, NMAH.

<sup>79</sup> See JBC, “Dainty and Artistic Desserts,” 40; JBC, “Dainty Desserts,” 27; and Chr. Hansen’s Laboratory, “Dainty Junkets” (1915): 6

<sup>80</sup> Turner, *How the Other Half Ate*, 35, 62.

coloring practice was no longer a time-consuming process. However, even if they could afford to buy commercial colors, the making of elaborate ornamental dishes still required time, skill, kitchen space, and equipment. In addition, the popular discourse about food coloring practice and colorfully arranged dishes was concerned predominantly with white middle- and upper-class women, reinforcing the association between class and visually attractive foods.

Nevertheless, as inexpensive synthetic food dyes became widely available in the early twentieth century, artificiality became an important part of working-class women's everyday cooking. Artificial coloring of foods, especially of margarine, became a significant means for lower-class women to provide appetizing meals to the family. By mixing dye with white margarine, housewives could serve it as a substitute for butter.<sup>81</sup> Grocers usually provided color capsules free of charge for customers.<sup>82</sup> Color capsules provided a solution for margarine manufacturers to evade the ten-cent tax established by the Federal Margarine Act in 1902 and still offer consumers yellow margarine. Especially during and after World War I, as the price of butter skyrocketed, margarine became an important substitute for an increasing number of consumers.

To promote the purchase of white margarine and show consumers how to color the product, margarine producers sent sales agents to local stores and distributed

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<sup>81</sup> Armour & Company Advertisement, *Chicago Tribune*, June 27, 1902; "Oleomargarine," *Sixteenth Annual Report of the State Dairy Commissioner to the Governor of the State of Iowa*, 1902 (Des Moines, IA: Bernard Murphy, 1902): 13-14; and "Oleomargarine to Be Boomed: Armour to Sell Uncolored Article with Cute Capsule," *San Francisco Call*, June 7, 1902.

<sup>82</sup> Sheldon Hochheiser, "Synthetic Food Colors in the United States: A History under Regulation" (PhD diss., University of Wisconsin-Madison, 1984): 67.



brochures.<sup>83</sup> One of the major manufacturers, the John F. Jelke Company, distributed an eight-page leaflet with color illustrations in the mid-1910s. Each page showed a woman coloring margarine and explained the process step by step (Fig.24). After margarine became soft enough, it was placed in a bowl. Then the color was dropped

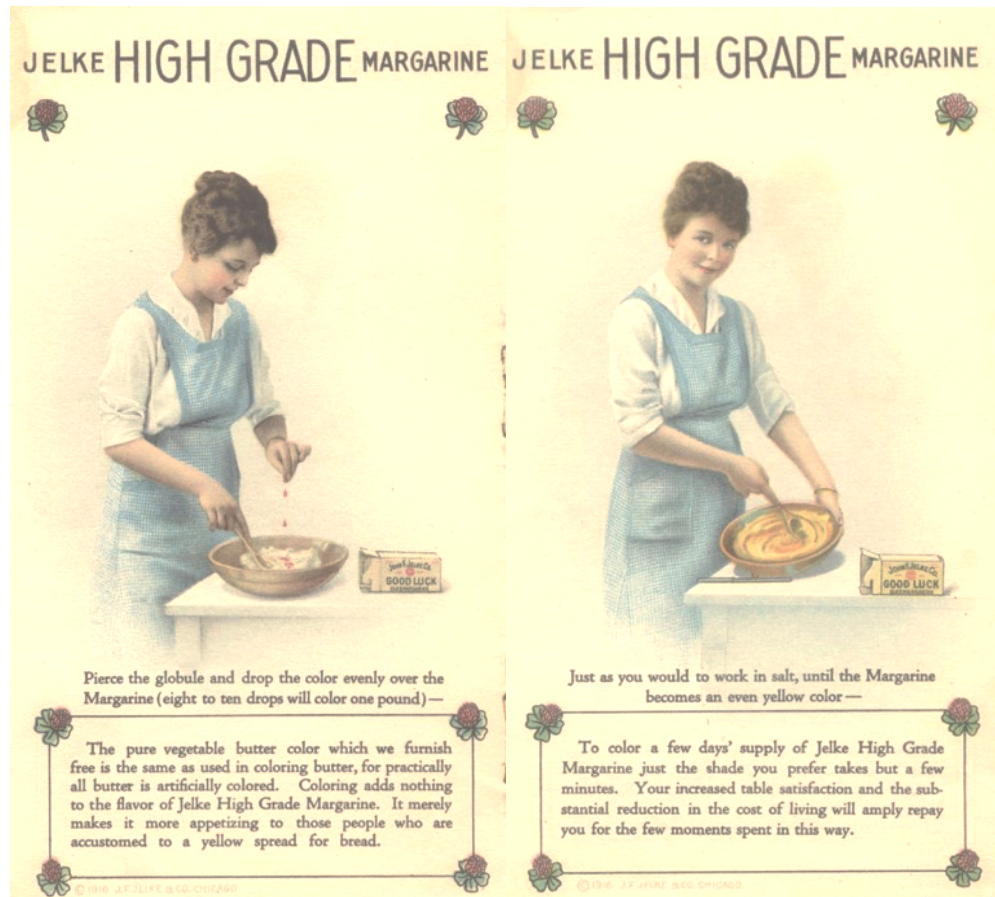


Figure 24 “How to Color Jelke High Grade Margarine for Your Own Family Table,” c.1916. Hagley Museum and Library.

<sup>83</sup> “Oleo in Kansas,” *Dairy and Creamery* 5, no. 12 (July, 1903): 28. See also “Is the Oleo Law a Failure,” *Dairy and Creamery* 5, no. 3 (February 1, 1903): 11; and “About the Oleomargarine Law,” *Dairy and Creamery* 5, no. 4 (February 15, 1903): 11.

evenly over the margarine (about eight to ten drops per pound). The next step was to “work it over and over” with a spoon or ladle until it became an even yellow color. The leaflet also noted: “Jelke High Grade Margarine is free from artificial color because the U.S. Government imposes a tax of ten cents per pound on all Margarine artificially colored by the manufacturer.”<sup>84</sup> In explaining why consumers needed to color the product at home as well as how to color it, Jelke indicated that the time and trouble they were taking was not for the sake of the company but for consumers themselves to save the extra ten cents which might have been added to the retail price. The practice of transforming margarine from a bland white look to a rich yellow color symbolized domestic ingenuity and frugality as a female virtue of lower-class women.

### **Artificiality, Adulteration, and Daintiness**

Packaged food dyes did not displace the old method of coloring foods with fruit and vegetable juices entirely, due to consumers’ and professionals’ concern over the toxicity of commercial food colorings at the turn of the twentieth century. As food manufacturers increasingly used dyes, including poisonous substances, for their products, government officials, journalists, home economists, and social reformers involved in the Pure Food movement harbored a suspicion about the safety of synthetic dyes. Especially before the federal government enacted the Pure Food and

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<sup>84</sup> John F. Jelke Company, “How to Color Jelke High Grade Margarine for Your Own Family Table” (Chicago: John F. Jelke Co., 1916), Hagley Museum and Library, Wilmington, DE. See also John F. Jelke Company, “Jelke Good Luck Margarine: The Finest Spread for Bread for Table Use and for Cooking” (Chicago: John F. Jelke, 1920), Hagley Museum and Library.

Drug Act in 1906, cookbook authors and home economists had generally considered homemade dyes as safer than commercial colorings since many of these packaged dyes contained synthetic colors. In an 1898 article in the *Ladies' Home Journal*, Sarah Tyson Rorer, director of the Philadelphia Cooking School, recommended that housewives use spinach juice for green coloring as it was “perfectly harmless.” “I doubt the green coloring matter sold in the market was not made from spinach,” Rorer declared.<sup>85</sup> An 1899 issue of the *Boston Cooking School Magazine* also argued that in making candies, “vegetable colorings [were] best” and suggested using such coloring ingredients as beets, cranberry juice, cochineal, fresh spinach, egg yolks, and juice of grated carrots rather than purchasing food colorings at stores.<sup>86</sup>

The adulteration of candies with cheap poisonous colorings posed a serious issue to government officials, social reformers, and mothers. Children who could not afford to buy expensive confections usually purchased penny candies, which often contained poisonous dyes used only “for the silly purpose of pleasing the eye” of children, in the words of a cookbook author.<sup>87</sup> In an 1865 confectionery cookbook, the author argued that the adulteration and poisonous coloring of candies was “becoming frightfully common” and that it was “really unsafe to eat any colored sugar,”

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<sup>85</sup> “Mrs. Rorer’s Answers to Questions,” *LHJ*, April 1898, 48. See also Lucas, “With Peaches In.”

<sup>86</sup> “Household Hints,” *BCS*, February, 1899, 291. See also Helen Combs, “Making the Table Attractive,” *LHJ*, June 1893, 30; and “Crumbs,” 193.

<sup>87</sup> J. M. Sanderson, *Cook and Confectioner, the Complete Cook, Plain and Practical Directions for Cooking and Housekeeping* (Philadelphia: Leary & Getz, 1849), 95. See also Mary Theiss and Lewis Theiss, “Fake Sweets and Soft Drinks to Be Dodged,” *Pearson’s Magazine*, July 1911, 81.

especially cheap candies.<sup>88</sup> According to an 1877 *New York Times* article, cheap candies usually contained “some of the most deadly poisons,” such as red lead, copper, gamboge, vermilion, and lead chromate.<sup>89</sup>

Coloring foods at home, especially candies, served as a way for women to prevent their children from purchasing poisonous products.<sup>90</sup> In 1899, one confectionery cookbook author argued that the fact that “home-made candies were absolutely pure” was “certainly no secondary consideration to a thoughtful mother.”<sup>91</sup> A 1897 *Ladies’ Home Journal* article directed to use a few drops of cochineal dye for coloring candies in pink to prevent any possibilities of poisonous ingredients.<sup>92</sup> To give children ice cream in summer, it should be colored pink with cochineal, noted another article in the *Journal*.<sup>93</sup>

To convince consumers that commercial food dyes were not poisonous, food coloring makers stressed the safety of their products as well as the economic benefit

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<sup>88</sup> *The Art of Confectionery*, 14-15.

<sup>89</sup> “Adulterated Confectionery: The Poisonous Compounds That Are Sold in Cheap Shops for Candy,” *NYT*, December 8, 1877. See also “Things Not Always What They Seem: Adulterated Goods That Have Been Sold to an Unsuspecting Public,” *NYT*, December 27 1895.

<sup>90</sup> Woloson, *Refined Tastes*, 193. See also Philip P. Gott and L. F. Van Houten, *All about Candy and Chocolate: A Comprehensive Study of the Candy and Chocolate Industries* (Chicago: National Confectioners’ Association, 1958), 17-20; and Samira Kawash, *Candy: A Century of Panic and Pleasure* (New York: Faber and Faber, 2013), 51-72.

<sup>91</sup> Scranton, “Candy Making Recipes,” 16.

<sup>92</sup> “Suggestions for Mothers,” *LHJ*, September 1897, 30.

<sup>93</sup> “Suggestions for Mothers,” *LHJ*, August 1895, 27.

and convenience of using commercial colors. The Price Flavoring Extract Company of Chicago, which supplied “Dr. Price” food colors for household use mainly in the Midwest, declared in its 1904 brochure that its dyes were derived only from vegetable sources without synthetic dyes or “any other substance detrimental to health.” The firm asserted that since “a love of daintiness” was “inherent in the heart of every true housewife,” its pure and safe colors could help women create visually appealing dishes “without loss of health or comfort.”<sup>94</sup>

The Joseph Burnett Company, whose coloring products were made largely of synthetic dyes, took advantage of the federal regulation as an endorsement of its food colors as harmless.<sup>95</sup> When the USDA admitted seven synthetic dyes as certified colors in 1907, Burnett sent its color samples to the Bureau of Chemistry in the USDA for certification.<sup>96</sup> While the firm did not specify to customers its dye ingredients, it declared in its promotion materials that a sample of every batch was sent to the government for analysis and stressed that the purity of its colors was certified by the

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<sup>94</sup> Price Flavoring Extract Company, “Dr. Price’s Delicious Desserts Containing Practical Recipes Carefully Selected and Tested” (1904), box 1900s-1, Nicole De Bona Peterson Collection of Advertising Cookbooks, Rubenstein Library. The firm provided various food colors, including Strawberry Red, Lemon Yellow, Chocolate Brown, Purple Violet, Blood Orange, and Apple Green.

<sup>95</sup> State of Washington, Sixth Biennial Report of the Dairy and Food Commissioner for the Biennial Period Ending October 31, 1906: 81; and “Coloring Compounds,” Sixteenth Biennial Report of the Minnesota State Dairy and Food Commissioner, 1917: 39.

<sup>96</sup> H. Burnett to W. G. Campbell, 25 February 1919, box 55, entry 1001, Records of the Food and Drug Administration, Record Group (RG) 88, National Archives, College Park (NACP); and Campbell to Joseph Burnett Company, 3 March 1919, box 55, entry 1001 RG 88, NACP.

federal authority. Burnett also touted the intensity of its colors to stress their economic benefit: as consumers needed only a small amount of Burnett's color pastes, they could use a jar for long time. In addition, the firm appealed to customers high product quality by emphasizing that its dyes were tasteless, easily soluble in liquids, and unchanged by strong lighting or high temperatures, necessary features when colors were used in cooking.<sup>97</sup>

As synthetic dyes became widely available in the early twentieth century, cooking authorities served to encourage women to use commercial dyes. In *The Boston Cooking-School Cookbook* (1896), Fannie Merritt Farmer, principal of the Boston Cooking School from 1891 to 1902, directed to use Burnett's "fruit red" dye to color peach syrup, gelatine, and pudding, and its "leaf green" for pistachio ice cream.<sup>98</sup> The *Boston Cooking School Magazine* frequently featured Burnett's advertisements of paste colors, as well as vanilla extracts. An advertisement of the food dye manufacturer Christopher Hansen's Laboratory Company, which also supplied butter colors for the dairy industry, appeared in the revised edition of *Mrs. Lincoln's Boston Cook Book*, published in 1903; the earlier 1884 edition did not include any promotion for commercial colors.<sup>99</sup> The 1903 edition also featured "Additional Recipes," including dishes that required "color pastes." For "Sultana Roll," Lincoln directed to

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<sup>97</sup> JBC, "Dainty and Artistic Desserts," 4.

<sup>98</sup> Farmer, *The Boston Cooking-School Cookbook*, 321, 352, 354, 375.

<sup>99</sup> Lincoln, *Mrs. Lincoln's* (1884; and 1903), n.p.

color it in “a delicate green with green color paste.”<sup>100</sup> To color frozen pudding, she advised readers to “color it a delicate tint with yellow, pink, or green color paste.”<sup>101</sup>

Women’s magazines also promoted the use of food colors by suggesting that packaged dyes were not necessarily toxic. A 1901 *Ladies’ Home Journal* article noted that the “various colorings sold for icings are used in such small quantities that they are harmless.”<sup>102</sup> A food editor of *Good Housekeeping* contended that she preferred a dye called “Amaranch” (one of the synthetic dyes certified by the USDA) to cochineal since it was a “beautiful color and perfectly harmless.”<sup>103</sup> As cookbooks and magazines dropped their recipes for dye making and stressed the safety of commercial colorings, food colors became an ingredient that housewives expected to purchase at stores rather than to make at home by themselves.

In appealing to middle- and upper-class female consumers, dye and gelatin makers often promoted daintiness as the key feature of their products. In its 1903 brochure, the Christopher Hansen’s Laboratory Company advertised its food coloring “Dainty Colors,” sold in one-ounce bottle at ten cents.<sup>104</sup> As its brand name indicates,

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<sup>100</sup> Ibid., 551. See also Marion H. Neil, *Candies and Bonbons and How to Make Them* (Philadelphia: David McKay, 1913), 22, 32, 51, 56-57.

<sup>101</sup> Lincoln, *Mrs. Lincoln’s* (1903), 552.

<sup>102</sup> “Mrs. Rorer’s Helps for Young Housekeepers,” *LHJ*, November 1901, 48

<sup>103</sup> “Some Recipes for Frosting,” *GH*, December, 1911, 837. See also “Queries and Answers,” *BCS*, April 1907, 447.

<sup>104</sup> “Chr. Hansen’s Junket Colors,” *Trained Nurse and Hospital Review* 40, no. 1 (July 1903): 202. H. Kohnstamm & Company, which had initially supplied dye products to the industry, also supplied packaged food dyes for home use. See H. Kohnstamm & Company Advertisement, *Chicago Tribune*, December 31, 1911.

the firm claimed that its products were well suited especially for coloring so-called dainty desserts, including candies, ice creams, jellies, icings, and gelatin desserts, suggesting that women could present the ideal femininity by using its colorings.<sup>105</sup> The Joseph Burnett Company distributed brochures, including “Dainty Desserts and Confections” and “Dainty and Artistic Desserts,” and noted that women could easily create “artistic delicacies for the table” with the firm’s color pastes.<sup>106</sup> Burnett also warned women not to use too much of its color pastes since their shades were strong and “delicate hues” were “more attractive and much desirable.”<sup>107</sup> Gelatin producer Knox also distributed leaflets, such as “Dainty Desserts for Dainty People,” in the mid-1910s, providing recipes of colorful gelatin desserts and salads.<sup>108</sup> Through their promotion materials, food dye and gelatin manufacturers taught housewives how to give foods the “right” colors that represented the ideal aesthetic taste of middle- and upper-class women, helping them aspire to feminine ideal.

Burnett’s advertising rhetoric echoed one of the principles of scientific cooking. Since the late nineteenth century, home economists’ research had mainly focused on the digestibility and nutritional function of foods. Yet they were not necessarily indifferent to taste but believed that palatability of food, as well as its nutritional value, was an essential part of food consumption. Ellen Richards, a pioneer

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<sup>105</sup> Chr. Hansen’s Laboratory Company, “Dainty Junkets” (1915): 6. See also Chr. Hansen’s Laboratory Advertisement, *BCS*, June 1901, lxiv.

<sup>106</sup> Burnett’s Color Pastes Advertisement in *About Vanilla*.

<sup>107</sup> JBC, “Dainty and Artistic Desserts,” 4. See also JBC, “Dainty Desserts,” 4.

<sup>108</sup> Knox, “Dainty Desserts for Dainty People” (1915). See also Jell-O Advertisement, 1908, box 5, Loy Baxter Papers, Rubenstein Library.



of the home economics movement, noted in the leaflet for the Rumford Kitchen exhibit at the 1893 World's Columbian Exposition in Chicago: "The palate is the Janitor and unless he be conciliated, the most nutritious food will find no welcome."<sup>109</sup> Following home economists' interest in taste and digestion, Burnett claimed in its 1914 leaflet:

By appealing to the eye with pleasing combinations of form and color, or to the palate by the occasional and judicious use of flavorings, the lagging appetite is aroused, the fluids that promote digestion are incited to flow, and even the plainest and most common articles of food are eaten with relish and avidity.<sup>110</sup>

In the following year, the firm distributed a recipe brochure, written by home economist Janet MacKenzie Hill, who taught at the Boston Cooking School and served as an editor of the *Boston Cooking School Magazine*. Burnett asserted that the "daintiness of Burnett's Standard Color Pastes [would] tempt the most discriminating appetite."<sup>111</sup> By commissioning a well-known home economist, the company sought to demonstrate that the color of food served not simply to please the eyes but also to stimulate the function of digestive organs.<sup>112</sup> In doing so, the firm promoted its products as well as food coloring practice as a "scientifically" endorsed way for women to create visually appealing dishes.

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<sup>109</sup> Quoted in Megan J. Elias, *Stir It Up: Home Economics in American Culture* (Philadelphia: University of Pennsylvania Press, 2008), 26.

<sup>110</sup> JBC, "Dainty Desserts," 3.

<sup>111</sup> JBC, "Dainty and Artistic Desserts," 3.

<sup>112</sup> In the early twentieth century, food manufacturers and home appliance companies increasingly hired well-known domestic scientists, including Mary J. Lincoln, Sarah Tyson Rorer, and Janet MacKenzie Hill, as consultants to write recipes and leaflets to promote their products. Goldstein, *Creating Consumers*, 178-79.

While Jell-O continued to associate itself with colorful dishes during the 1920s and 1930s, other gelatin manufacturers began to place less emphasis on visual appeal and more on the health benefits of gelatin products.<sup>113</sup> By the mid-1930s, Knox had ceased to enclose food colorings in either its No.1 or No.3 package but continued to supply the fruit acid in the No.3 variety.<sup>114</sup> By the 1940s, the No.3 package was terminated, and Knox supplied only one gelatin variety with no flavor or color added.<sup>115</sup> The discontinuation of enclosing food colorings indicated Knox's change in marketing strategy to compete against colored products, specifically Jell-O. In a 1938 pamphlet, Knox asserted to consumers that its product "should not be confused with ready-flavored gelatin desserts" which were "85% sugar and factory flavored." "The protein content of such powders is practically nil and their high sugar percentage rule them out of the non-fattening diet!"<sup>116</sup>

Although recipes that Knox introduced in its brochures sometimes called for additional food colorings, particularly for making desserts, the company associated its product increasingly with healthy meals, as opposed to sugar- and color-coated desserts. In its 1931 brochure, Knox stated that many years of medical research had "proven that Gelatine [*sic*] aids digestion and is valuable in combination with milk for

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<sup>113</sup> The Genesee Pure Food Company was renamed Jell-O Company in 1923, and merged with Postum Cereal Inc., in 1925.

<sup>114</sup> "Knox Gelatine: Desserts, Salads, Candies, and Frozen Dishes," 1936, box 29, Culinary Catalog Collection, Schlesinger Library.

<sup>115</sup> "Knox Gelatine: Salads, Desserts, Pies, Candies," 1943, box 7, Product Cookbooks Collection, NMAH.

<sup>116</sup> "Control Your Weight with Knox Gelatine," 1938, box 29, Culinary Catalog Collection, Schlesinger Library.

infants and adults where only a plain gelatine [*sic*] without sugar, color or flavoring can be used.”<sup>117</sup> While the color of foods continued to be an important factor in cooking and serving meals, the change in Knox’s advertising rhetoric indicated that pre-colored products were “too artificial” and unhealthy while the addition of food dyes by housewives was permissible in home cooking.

### **Packaged Creativity: Cake Decoration in Post-War America**

By the mid-twentieth century, the artificiality and convenience of food coloring, and of cooking in general, had reached a new stage. The development of food technology and science allowed manufacturers to create new kinds of processed foods, including cake mix and frosting mix. These products indicated women’s increasing acceptance of artificiality. American women had been “artificially” coloring cakes and molding foods into various shapes to make “dainty” dishes since the previous century. Yet mid-twentieth-century products provided a different level of artificiality than earlier decorative cooking. Packaged foods were made up primarily of artificial ingredients, including not only color additives but also artificial flavors, preservatives, and dehydrated eggs. They were products of chemical synthetization, invented in laboratories and manufactured in factories, rather than harvested on trees or vines.

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<sup>117</sup> “Knox Gelatin: Dainty Desserts Candies Salads,” 1931, box 7, Product Cookbooks Collection, NMAH.

Cake mix was first patented in the early 1930s.<sup>118</sup> But many of these products were sold regionally and the cake mix market did not take off until the mid-1940s. In 1947, cake mix sales amounted to about \$79 million. After two major milling companies, General Mills and Pillsbury, introduced cake mixes in 1947 and 1948 respectively, the market began expanding rapidly. By the early 1950s, American consumers were spending more than twice the 1947 amount.<sup>119</sup>

With postwar affluence, food advertisers promoted to middle-class housewives the consumption of industrially processed products as an essential means to pursue new lifestyles and to perform their roles as mothers and wives.<sup>120</sup> As women's employment rate increased during the mid-twentieth century, those packaged ingredients became less-time-consuming, fool-proof cooking aids for busy housewives.<sup>121</sup> They transformed cake baking to a simple process of just adding water

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<sup>118</sup> John D. Duff and Louis E. Dietrich, Process of making a dehydrated flour mixture, US Patent 1,931,892, filed December 10, 1930, and issued October 24, 1933; and John D. Duff and Louis E. Dietrich, Dehydrated flour mix and process of making the same, US Patent 2,016,320, filed June 13, 1933, and issued October 8, 1935.

<sup>119</sup> Shapiro, *Something from the Oven*, 72-73.

<sup>120</sup> For the history of postwar consumer culture, see Lizabeth Cohen, *A Consumers' Republic: The Politics of Mass Consumption in Postwar America* (New York: Vintage Books, 2003); Gary Cross, *An All-Consuming Century: Why Commercialism Won in Modern America* (New York: Columbia University Press, 2000), esp. chaps. 3-4; Marling, *As Seen on TV*; and Susan Strasser, *Waste and Want: A Social History of Trash* (New York: Metropolitan Books, 1999), esp. chap.7.

<sup>121</sup> In 1950, about 34 percent of women (single and married) were employed outside home; in 1920, the rate was about 20 percent. "Changes in Women's Labor Force Participation in the 20th Century," Bureau of Labor Statistics, U.S. Department of Labor, February 16, 2000, accessed December 21, 2015, <http://www.bls.gov/opub/ted/2000/feb/wk3/art03.htm>; and Mitra Toossi, "A Century

and an egg to a mix. Hours of preparation, varieties of ingredients, or special skill was no longer necessary for creating decorative dishes to convey femininity. *Good Housekeeping* noted in 1950: “There’s no need for you – today’s bride – to quake in your boots when your husband begs you to make his favorite cake. Just take a package of cake mix from your pantry shelf and go to work.” The first instruction the article gave to the readers was: “Read directions on cake-mix package or in special recipe ... [and] heat oven to temperature given on package.”<sup>122</sup> While providing women with convenience, these products standardized how homemade cakes tasted and looked.

Food manufacturers’ advertising rhetoric integrated artificiality and convenience with creativity. They believed that women would not accept convenience alone as the advantage of new products. In conducting research on General Mills cake mix in the mid-1950s, market researcher Ernest Dichter argued that just adding water was so easy that women did not feel a sense of involvement or satisfaction in cake making, and advised the firm to change the formula to have women add an egg as well as water to the mix.<sup>123</sup> In promoting food products, manufacturers sought to convince housewives that convenient factors in food preparations enabled them to present their creativity and affection for their families. As historian Karal Ann Marling has noted, the cake served as “sculpture, frosted in living color,” which symbolized “a test of

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of Change: The U.S. Labor Force, 1950-2050,” *Monthly Labor Review* (May 2002): 15-28.

<sup>122</sup> Dorothy B. Marsh and Elizabeth J. Gillen “The Bride’s First Cake,” *GH*, April 1950, 149.

<sup>123</sup> Marling, *As Seen on TV*, 213-14. See also “A Psychological Research Study on the Effectiveness of Betty Crocker in Promoting General Mills Products General Mills,” 1953, box8, Ernest Dichter Papers (Accession 2408), Hagley Museum and Library.

mother love and womanly competence, the battleground between packaged mix and mastery of the culinary arts, between modern ease and old-fashioned, time-consuming kitchen drudgery.”<sup>124</sup> Decorated cakes, made with packaged ingredients, represented a subtle balance between convenience and creativity.

As “womanly love” was no longer in the baking, it was transferred to the decorating and style of the cake. In a 1950 article in *Better Homes and Gardens*, the author claimed: “Beauties, every one! All these luscious cakes start with a mix.” Success in cake making was “packaged right along with the precision ingredients.” “You can put your effort into glorifying your cake with frosting, dreaming up an exciting trim that puts your own label on it.”<sup>125</sup> Likewise, *Sunset* magazine asserted in 1954 that “sometimes it’s the frosting that really sets a cake apart.”<sup>126</sup> Women’s magazines featured a number of ways of making colorful frosting and decorating cakes. Some of them did not even include cake baking recipes but only mentioned a box of cake mix, and focused more on cake decoration. *Good Housekeeping* featured several series of columns focusing solely on cake decoration, explaining how to pipe frosting and create decorative shapes, such as stars and flowers, with frosting.<sup>127</sup> In the mid-1960s, General Mills even published *Betty Crocker’s Cake and Frosting Mix Cookbook*, which focused solely on making cakes with packaged mixes. In its

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<sup>124</sup> Marling, *As Seen on TV*, 224.

<sup>125</sup> Myrna Johnston, “Glamour Tricks with Cake Mix,” *Better Homes and Gardens*, September 1953, 90.

<sup>126</sup> “Frosting Can Make the Cake,” *Sunset*, November 1954, 174.

<sup>127</sup> See No title, *GH*, August 1957, 138; and “Frosting Flowers,” *GH*, September 1957, 144.

introduction, Betty Crocker/General Mills retrospectively declared to women that the advent of cake mix in the 1940s had been “the revolution”: as “ease and convenience” became “the hallmarks of cake-making,” woman became “a mix-minded artist.”<sup>128</sup>

Color became a means for food manufacturers to convince housewives to show their personalities and creativity by using mass-produced goods. Cake mix manufacturers suggested almost infinite possibilities of cake decoration with different colors, indicating that cake mix and frostings would be a fool-proof tool for women to be “creative.”<sup>129</sup> The light pink shade was still one of the most popular color for frostings, often featured in advertisements of Betty Crocker and other cake mix brands. By the mid-twentieth century, the pink color had generally come to symbolize femininity, as well as sweetness and affection.<sup>130</sup> While pink and white were more often featured than other shades in many recipes, creating various colors of frosting for different occasions was important for cake making. A 1953 recipe booklet “Cake Secrets,” distributed by General Foods, introduced pink, white, green, and yellow colors of frosting for decorating various cakes and cupcakes (Fig.25). Some of its recipes asked for a box of General Foods cake mix while explaining how to make different colors of frostings and decorate cakes. Stressing that cake making and decoration were simple processes, the booklet suggested that any women could easily

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<sup>128</sup> *Betty Crocker’s Cake and Frosting Mix Cookbook* (New York: Colden Press, 1966)

<sup>129</sup> See General Foods Advertisements, *LHJ*, September 1951; and Betty Crocker Frosting Mix Advertisement, *GH*, November 1957.

<sup>130</sup> Jo B. Paoletti, *Pink and Blue: Telling the Boys from the Girls in America* (Bloomington, IN: Indiana University Press, 2012).



Figure 25 General Foods, “Cake Secrets,” 1953. Product Cookbook Collection, National Museum of American History, Smithsonian Institution.

present their creativity, femininity, and hospitality to their family and guests by using multiple colors of frostings.<sup>131</sup>

As packaged products became increasingly identical among different companies except their brand names, color variations became the competitive edge for food processors to differentiate themselves from their competitors. In the early 1950s, the Quaker Oats Company introduced Aunt Jemima cake mixes, which enclosed a packet of flavor and color powder with no additional cost (Fig.26).<sup>132</sup> “Change the

<sup>131</sup> General Foods, “Cake Secrets,” 1953, box 4, Product Cookbooks Collection, NMAH. See also Dorothy B. Marsh, “Good Housekeeping’s Cake Cook Book,” *GH*, February 1952, 77-115; “Cake-Frosting Specials,” *Better Homes and Gardens*, January 1958, 83-84.

<sup>132</sup> Aunt Jemima Cake Mix Advertisement (1952).



**NEWEST IDEA  
IN CAKE MIXES!**

# Change the flavor and color of your cakes -like magic!

The Secret? Aunt Jemima's  
**Flavor-Changer  
Color-Packets**

**FREE** OF ADDED COST! ONE SURPRISE PACKET  
IN EVERY SPECIALLY-MARKED PACKAGE!

**Here's all you do—**  
You can make this luscious  
**Silver Cake**  
OR you can add the contents of a  
**FLAVOR-CHANGER COLOR-PACKET**  
and make one of these festive  
Different Flavored cakes!

Aunt Jemima guarantees you  
sure success—every time!

It's Aunt Jemima's newest (and gay-  
est) triumph. Inside every package  
of Aunt Jemima Cake Mix there's a  
Flavor-Changer Color-Packet. Add  
the contents of this packet to the  
cake batter and presto! You bake a  
pally-colored homegood cake... with  
flavor to match! What fun you'll  
have, parading in with these party-  
gay Aunt Jemima cakes! How about  
serving one tomorrow night!

There are also  
**2 Flavor-Changer  
Color-Packets**  
for Aunt Jemima Devil's Food  
ALMOND MOCHA and  
CHOCOLATE PEPPERMINT

*Golden Lemon Cake*

*Delightful Wintergreen Cake*

*Heavenly Peppermint Cake*

*Old Time Spice Cake*

## Aunt Jemima Cake Mixes

**Silver Cake and Devil's Food**

Figure 26 Aunt Jemima cake mix advertisement, 1952. Author's collection.

flavor and color your cakes – like magic!” noted the advertisement. There were four varieties of “flavor-changer color-packets”: yellow for “Golden Lemon” cake; green for “Delightful Winter” cake; pink for “Heavenly Peppermint” cake; and orange for “Old Time Spice” cake. Consumers could create four different flavors and colors of sponge cakes by simply adding a packet of powder to the cake mix, which was originally a white cake. The advertisement’s multicolor illustration conveyed a message that baking a cake out of a box was not only easy and convenient but also exciting, fun, and even creative. As consumers could buy different colors of the same brand product, color variations allowed firms to encourage repeat purchases.<sup>133</sup>

During the postwar era, the gaiety of colorfully decorated cakes was increasingly associated with motherly love. The shift in the popular perception of childhood, child rearing, and parenting helped transform the significance of cake baking, decoration, and food coloring. Children had become the central focus of the family, and creating visually attractive foods was meant to please them. The child-centered family was not entirely a postwar development. By the late-nineteenth century, childhood had come to be understood as a distinctive period of life, different from adults. Care for children, particularly motherly love, became essential for

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<sup>133</sup> For a history of the Aunt Jemima brand in relation to food marketing and racial issues, see Brian D. Behnken and Gregory D. Smithers, *Racism in American Popular Media: From Aunt Jemima to the Frito Bandito* (Santa Barbara, CA: Praeger, 2015); Thomas Hine, *The Total Package: The Evolution and Secret Meanings of Boxes, Bottles, Cans, and Tubes* (Boston: Little, Brown, 1995); Marilyn Kern-Foxworth, *Aunt Jemima, Uncle Ben, and Rastus : Blacks in Advertising, Yesterday, Today, and Tomorrow* (Westport, CT: Greenwood Press, 1994); M. M. Manring, *Slave in a Box: The Strange Career of Aunt Jemima* (Charlottesville: University Press of Virginia, 1998); and Diane Roberts, *The Myth of Aunt Jemima: Representation of Race and Region* (New York: Routledge, 1994).

children's growth, and they became the focus of the family, especially for urban middle-class households. Yet early twentieth-century child-rearing guides generally warned parents not to kiss their babies or cradle them too much, lest the children would become spoiled.<sup>134</sup>

Postwar affluence and the baby boom transformed concepts about childhood and child rearing. Americans married young and had an average of at least three children in a few years. In the 1940s and 1950s, the majority of Americans believed that creating the child-centered family marked the successful and happy personal life. Childlessness was considered deviant, selfish, and pitiable.<sup>135</sup> In his 1946 book, *the Common Sense Book of Baby and Child Care*, pediatrician Benjamin Spock – one of the most influential and controversial figures who provided advice on child rearing – argued that parents' love and attention to their child were necessary for children's growth. He argued that when parents hugged their kids and showed the babies that they were the most wonderful children in the world, it helped the children's spirit

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<sup>134</sup> Joseph E. Illick, *American Childhoods* (Philadelphia: University of Pennsylvania Press, 2002).

<sup>135</sup> Elaine Tyler May, *Homeward Bound: American Families in the Cold War Era* (New York: Basic Books, 1988), 137. For the history of children and childhood, see Marilyn Irvin Hold, *Cold War Kids: Politics and Childhood in Postwar America, 1945-1960* (Lawrence, KS: University Press of Kansas, 2014); Steven Mintz, *Huck's Raft: A History of American Childhood* (Cambridge, MA: Belknap Press of Harvard University Press, 2004); Steven Mintz and Susan Kellogg, *Domestic Revolutions: A Social History of American Family Life* (New York: Free Press, 1988); and Viviana A. Zelizer, *Pricing the Priceless Child: The Changing Social Value of Children* (Princeton: Princeton University Press, 1985).

grow, “just like the way milk [made their] bones grow.”<sup>136</sup> Spock’s advice and his popularity marked the dramatic shift in the understanding of parenting and childhood that stressed the importance of material and emotional devotion to children.

The child-centered view of families was apparent in cooking advice. Mothers had long made colorful foods for children. When commercial candies often contained poisonous substances in the late nineteenth century, many recipes recommended women color candies and desserts at home for the health of children. Although children’s health and nutritious foods were also important part of domestic advice in postwar popular media, they increasingly focused on the significance of eye appeal to attract the eyes of children. Many recipes indicated that women could establish affectionate relationships with their children, symbolized by colorful cakes, by resorting to easy, convenient recipes and products. In a 1953 article in *Better Homes and Gardens*, featuring cake mix, the author contended that children would “always remember ‘mother’s cakes’ as ever so special – perfectly delicious – pretty, too.”<sup>137</sup> The article suggested that even when cake mix was used, mothers could show their love to their children. More important than simple cake baking was elaborate decoration, which could also be done using frosting mix.

Cookbooks and magazines also taught women that making creative cakes for children was an essential role of mothers. A 1952 article in *Good Housekeeping*

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<sup>136</sup> Benjamin Spock, *The Common Sense Book of Baby and Child Care* (New York: Duell, Sloan and Pearce, 1946), 150. The book sold 500,000 copies in its first six months.

<sup>137</sup> Myrna Johnston, “Glamour Tricks with Cake Mix,” *Better Homes and Gardens*, September 1953, 130.

argued: “It isn’t a birthday without a cake.” The article introduced seven highly-decorated cakes for children. “Bobby’s Balloon Cake” was an angel food cake decorated with white frosting and different colors of gumdrop slices. The “Sweet Sixteen” cake was thickly frosted with light pink cream and different shades of candy wafers were inserted around the edge of the cake. The shapes of Humpty Dumpty, butterfly, and flowers were also used for cake ornaments.<sup>138</sup> The magazine’s 1957 article on cake decoration showcased a variety of decorated cakes. Some of them were made into different shapes, including a cat, a boat, a doll, and a boot.<sup>139</sup>

These decorated cakes and desserts often appeared in vivid color photographic images in cookbooks and women’s magazines due to the development of color printing technology in the mid-twentieth century. Color photography presented to women the appropriate shade and lightness of frosting colors, helping them visualize the finished product. In the late nineteenth century when cookbooks rarely contained color illustration but only the textual instruction, the lightness of shades for certain food relied largely on one’s preference. Women were expected to know how much cochineal or spinach juice to be added to their cakes and candies. Now frosting mix and some cake mix pre-colored by manufacturers allowed women to create the “right” color of cake without measuring the dye or even thinking about how to color it.

Colorful images and recipes provided a kind of culinary fiction and fantasy for middle-class women, many of whom probably never made those intricate, time-consuming cakes but only enjoyed looking at them in magazines and cookbooks. Yet

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<sup>138</sup> Marsh, “Good Housekeeping’s Cake Cook Book,” 109.

<sup>139</sup> “Cake Decorating,” *GH*, March 1957, 101-19. See also “Five Party Cakes,” *GH*, April 1955.

while setting a standard for ideal mothers and wives, these prescriptive recipes also suggested that there were always easier alternatives with a help of short-cut ingredients.<sup>140</sup> In analyzing the success of cake mix and similar products in the mid-twentieth century, Dichter argued that not only did mixes save time, but they also enabled the modern woman to “be creative in new forms.” These new products allowed her to bake at home in “an easy fashion which assure[d] her success almost every time.”<sup>141</sup> Because some of the recipes for elaborate cakes suggested to use cake mix and packaged frosting, women could make simpler versions of decorated cakes by adding water and an egg to cake mix and icing the cake with frosting mix.

Creativity and convenience, both made possible by artificial products, became the crucial elements of postwar cake making. The “creativity” that cake mix and other packaged products afforded to women was presented in structured and controlled ways: cookbooks and women’s magazines encouraged women to be “creative” while providing specific directions to follow. Using packaged ingredients required less imagination as well as less time. Moreover, women were expected to use and express their “creativity” primarily to serve the family’s needs rather than for the sake of their own enjoyment.<sup>142</sup>

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<sup>140</sup> See Marling, *As Seen on TV*, 229-31.

<sup>141</sup> Dichter, *Handbook*, 28. See also Institute for Motivational Research, Inc., “A Creative Memorandum on the Psychology of Cake Mixes,” 1961, box 64, Ernest Dichter Papers, Hagley Museum and Library.

<sup>142</sup> Erika Endrijonas, “Processed Food from Scratch: Cooking for a Family in the 1950s,” in Inness, *Kitchen Culture in America*, 157-73.

Not only did food products become highly artificial in postwar cake baking, but the association between taste and sight also became “artificial,” or arbitrary. The colors of cake mix and frosting mix often indicated their flavors. But the pink shade of strawberry flavored frosting, for instance, was not necessarily the color of actual strawberries. Nor did the frosting taste like fresh strawberries. As processed foods flooded into the market and colorful food advertisements filled in virtually almost all spheres of the visual environment from newspapers, magazines, and television to billboards, consumers learned to identify a specific pink shade as the color and flavor of “strawberries.” The use of artificial food coloring (and flavoring) and the arbitrary associations between color and taste allowed food processors to mass-produce standardized products economically and consistently and to market their products to mass-consumers as an essential means for being “creative.”

### **Conclusion**

The creation of colorful dishes and the use of food colors in households represented the transformation of ideal femininity, the rise of mass consumer society, and the close relationships among gender, class, and aesthetic taste. Until the late nineteenth century, visually appealing dishes signified upper-class women’s social and economic capital, as they had the luxury of resources, skill, and time for making intricate, time-consuming foods. The introduction of less expensive packaged food colorings and powdered gelatin products at the turn of the twentieth century eased the food coloring process and made decorative cooking accessible to middle-class households. With economic, social, and cultural changes in postwar America,

colorfully decorated desserts, especially thickly frosted cakes, became a quintessential symbolism of middle-class femininity.

The advent of new commercial products, intensive corporate marketing, and a shift in gender norms and family structures transformed not only how women created colorful dishes but also the degree to which women adopted artificiality in domestic cooking. As convenience became an important feature of processed foods that appealed to housewives in the early- to mid-twentieth century, food processors, advertisers, and cookbook writers touted artificiality in the household as a necessary practice for women to create dishes appealing to the eye and the palate. With packaged food dyes and cake mixes, women attained a means of making eye-appealing dishes conveniently and economically. Yet these products did not necessarily relieve women from never-ending housework.<sup>143</sup> New “convenient” ingredients might have allowed women to color foods and bake cakes in a shorter time, but they created other work, as well as higher expectations. The “proper” shades and decorations of cakes and desserts served as a marker of gender and class norms, symbolizing women’s “creativity,” which they pursued by using standardized products and following minute directions.

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<sup>143</sup> See Strasser, *Never Done*.



## CONCLUSION: GOING “NATURAL”?

In April 2012, the global coffee chain Starbucks announced that the firm would stop using cochineal dye for its Strawberry and Crème Frappuccino, Strawberry Banana Smoothie, and some pastries, sold in the United States.<sup>1</sup> The firm had only started using cochineal four months earlier, in order to switch its ingredients from artificial to natural colors. The controversy started in March, when a vegan Starbucks barista sent an email to the website [ThisDishIsVegetarian.com](http://ThisDishIsVegetarian.com) to inform other vegan consumers that some Starbucks drinks and foods were not vegan. The news was covered widely in a number of media, many of which described cochineal as disgusting and offensive, calling the dye “crushed bug” and “beetle juice.”<sup>2</sup> An online petition collected more than 6,600 signatures. The petition asked the coffee-shop giant to stop using the insect dye because it was not vegan or kosher and some customers

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<sup>1</sup> Cliff Burrows, “Cochineal Extract Update,” Starbucks Corp., April 19, 2012, accessed January 20, 2016, <http://blogs.starbucks.com/blogs/customer/archive/2012/04/19/cochineal-extract-update.aspx>.

<sup>2</sup> See for instance Ryan Jaslow, “Starbucks Strawberry Frappuccino Dyed with Crushed Up Cochineal Bugs, Report Says,” CBS News.com, March 27, 2012, accessed January 20, 2016, <http://www.cbsnews.com/news/starbucks-strawberry-frappuccinos-dyed-with-crushed-up-cochineal-bugs-report-says>; Cara Kelly, “Starbucks and the Great Beetle Extract Controversy,” *Washington Post*, March 20, 2012; Nancy Shute, “Is That a Crushed Bug in Your Frothy Starbucks Drink?” *The Salt: What’s on Your Plate*, NPR, March 20, 2012, accessed January 20, 2016, <http://www.npr.org/sections/thesalt/2012/03/30/149700341/food-coloring-made-from-insects-irks-some-starbucks-patrons>.

did not “want crushed bugs in their designer drink.” It also suggested to Starbucks various alternative “natural means to achieve the red coloring,” including red beet, black carrot, purple sweet potato, and paprika.<sup>3</sup> Within a month after the disclosure, Starbucks’ USA president Cliff Burrows announced in the corporate blog that the firm would replace cochineal with tomato-based lycopene coloring.<sup>4</sup>

Starbucks’s swift response to the criticism against cochineal, as well as its prior shift from artificial to natural colors, represents not only the firm’s strong concern over food colorings and its corporate image, but also a larger trend in the food industry today. Over the last decade, an increasing number of food manufacturers have been turning to natural colors while discarding chemically synthesized artificial dyes. In 2015 alone, companies including Hershey, Nestlé USA, Kraft, and General Mills announced they were replacing synthetic with natural colors. In February 2015, for instance, Nestlé USA promised to remove artificial colors from all of its chocolate candy products by the end of 2015.<sup>5</sup> Kraft declared that beginning in 2016, the firm would replace synthetic colors, added to its classic Macaroni & Cheese, with natural

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<sup>3</sup> Daelyn Fortney, “Stop Using Bugs to Color Your Strawberry Flavored Drinks,” change.org, March 2012, accessed January 20, 2016, <https://www.change.org/p/starbucks-stop-using-bugs-to-color-your-strawberry-flavored-drinks>.

<sup>4</sup> Burrows, “Cochineal Extract Update.”

<sup>5</sup> “Nestlé USA Commits to Removing Artificial Flavors and FDA-Certified Colors from All Nestlé Chocolate Candy by the End of 2015,” Nestlé USA Press Release, February 17, 2015, accessed September 21, 2015, <http://www.nestleusa.com/media/pressreleases/nestl%C3%A9-usa-commits-to-removing-artificial-flavors-and-fda-certified-colors-from-all-nestl%C3%A9-chocolate-candy-by-the-end-of-20>.

ones, including annatto, paprika, and turmeric.<sup>6</sup> As with Starbucks, there had been strong consumer protest against synthetic dyes due to potential health risks.

A historical study on the importance of color for food businesses can help us understand the origins and implications of contemporary issues over food coloring by situating them in a larger historical context. The controversy over artificial dye poses some of the questions that this dissertation explored. Why do food manufacturers continue using food dyes instead of stopping the use of all colors? Do natural colors make the food more “natural” and “safe”? What do consumers expect from the color of foods? Where do the expectations come from? To what extent would consumers accept artificiality?

In today’s color-saturated environment, the color of foods is something many people take for granted, yet they often have strong, and sometimes stubborn, ideas about how food should look. But the color of foods has never been “natural.”

The creation of color is, and has been, a dynamic and complex process. The dramatic transformation of visibility in American food consumption in the late

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<sup>6</sup> Kraft Macaroni & Cheese, accessed January 20, 2016, <http://www.kraftmacandcheese.com/FAQs>. See also Michael E. Miller, Kraft Mac & Cheese Just Got Duller. You Can Thank (or Blame) ‘The Food Babe,’” *Washington Post*, April 21, 2015. In June 2015, General Mills announced that it will remove artificial colors from all its cereals by the end of 2016. In May 2015, Panera Bread announced that the firm will stop using all artificial additives, including colors, by the end of 2016. Kevin Hunt, “A Big Commitment for Big G Cereal,” General Mills Blog, June 22, 2015, accessed January 20, 2016, <http://www.blog.generalmills.com/2015/06/a-big-commitment-for-big-g-cereal>; and “Panera Bread Becomes First National Restaurant Company to Share List of Unacceptable Ingredients,” Panera Bread Press Release, May 5, 2015, accessed January 20, 2016, <https://www.panerabread.com/panerabread/documents/press/2015/no-no-list-release%205-5-15.pdf>.

nineteenth through the mid-twentieth century laid the groundwork for the regulation of food safety, the expansion of food coloring businesses, and the creation of standardized, albeit artificial, notions of naturalness and freshness of foods in twenty-first-century America. In the late nineteenth century, the invention of economical and stable synthetic dyes afforded food producers a new way of uniformly coloring foods in desirable hues at greatly reduced prices. Innovations in agricultural technologies and the development of food science in the late nineteenth and twentieth centuries allowed agricultural producers and food processors to streamline production and create new products. Knowledge of food technology and color science became an essential means for producers to manipulate the color of foods and for government officials to regulate food adulteration. Butter became uniformly yellow all year round. Oranges came to look always bright orange. Even homemade cakes became identical when made with cake mixes and packaged frosting. Masses of standardized, clean, bright produce became a significant feature of modern supermarkets to present “freshness” to customers, since the mid-twentieth century.

As the addition of dyes became a common practice in the food industry and the consumption of processed foods expanded throughout the twentieth and twenty-first centuries, color ceased to be an intrinsic feature of foods but became a food component that producers adjusted to consumer taste by adding and subtracting coloring ingredients, just like salt, sugar, and pepper. The consumer protest against Starbucks, Kraft, and other food manufacturers similarly rested on the understanding that color was an *ingredient* of food products. As the petition against Starbucks’ cochineal dye proposed some alternatives for coloring foods, both protesters and manufacturers generally considered the use of natural dyes permissible. Even when

the dye was not derived from the food colored, coloring strawberry-based drinks with dye extracted from tomato substances was acceptable. Many consumers even praised Starbucks for the shift from cochineal to tomato-based color.<sup>7</sup> As numerous other examples such as the dyeing of oranges and butter suggest, the color of foods has become an external characteristic of foods that producers could manipulate and that consumers rely on for judging product quality.

Producers and consumers commonly believe that natural dyes are “safe” and “natural.” Since the early years of the artificial-natural dye controversy in the early twentieth century, USDA officials and scientists had also thought that natural dyes were safe; hence there had been virtually no regulation on these colors. Over the last few decades, however, scientists have reported that cochineal could cause very serious allergic reaction to some people.<sup>8</sup> In 2009, the Food and Drug Administration enacted a law requiring the declaration of cochineal extract on food labels.<sup>9</sup> Yet the labeling requirement does not necessarily guarantee safety to every consumer. Since the

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<sup>7</sup> Comments on Cliff Burrows’ blog post, in Burrows, “Cochineal Extract Update.”

<sup>8</sup> See Belén Añibarro, et al., “Occupational Asthma Induced by Inhaled Carmine among Butchers,” *International Journal of Occupational Medicine and Environmental Health* 16 (2) (2003): 133-37; Matthew J. Greenhawt and James L. Baldwin, “Carmine Dye and Cochineal Extract: Hidden Allergens No More,” *Annals of Allergy, Asthma and Immunology* 103 (1) (July 2009): 73-75; and Akihiro Kume, et al., “A Case of Type I Allergy to Cochineal Extract,” *Journal of Environmental Dermatology* 6 (1999): 148-52.

<sup>9</sup> U.S. Department of Health and Human Services, Food and Drug Administration, “Guidance for Industry: Cochineal Extract and Carmine: Declaration by Name on the Label of All Foods and Cosmetic Products That Contain These Color Additives; Small Entity Compliance Guide,” April 2009, accessed January 20, 2016, <http://www.fda.gov/ForIndustry/ColorAdditives/GuidanceComplianceRegulatoryInformation/ucm153038.htm>.

labeling is required only on food packages, if ingredients dyed with cochineal are used in restaurants, diners would not know if the food served contains cochineal unless they ask the chef.

As shown in the cases of synthetic dye legislation and margarine regulation, legal definitions and outcomes were largely the result of particular sets of interests and political decisions. The definition of “safety” and “adulteration” depended on scientific data, industry demands, state officials’ individual views on food purity, available scientific knowledge at the time, and consumers’ shifting perception about wholesome and natural foods. Nor were scientific studies necessarily “objective.” How to interpret the result and how to apply the study to regulation and business practices depended also on corporate demands, the connections between state and industry, and consumer expectations.

Not only the “safety” of food colors but also their “naturalness” is a fluid conception. As this dissertation has demonstrated, naturalness is far from a “natural” state of foods; rather it is a hybrid between nature and artifice that food producers and scientists created with careful control and engineering. For instance, feeding animals with some kind of coloring sources has a long tradition. At least since the nineteenth century, dairy farmers mixed marigold and saffron with cow’s feed to make butter golden yellow “naturally.” Today, feeds for farmed salmon are commonly mixed with red color additives to make the fish’s meat “salmon pink” because farmed salmon looks grayish when the color is not controlled, while wild salmon has pink or red meat. For consumers as well as for producers, salmon pink, controlled by producers, is the “natural” color of the fish even when the color is not a product of “natural” conditions.

It is difficult to draw a line between the natural and the artificial not only because naturalness is a product of human manipulation but also because consumers accept certain artificiality in foods. When consumers criticized the use of “artificial” synthetic dyes by Kraft and other food processors, they did not demand that manufactures remove processed foods, including macaroni and cheese, chocolate bars, and breakfast cereals, from the market. Using natural dyes does not necessarily make these industrially processed foods “natural.” So-called “natural” dyes are also products of highly mechanized manufacturing process – these commercial “natural” dyes are vastly different from the spinach or carrot juice nineteenth-century housewives used for their cooking. Yet artificiality is acceptable when color additives seem harmless and the product provides convenience.

The uniformity and consistency that food dyes (either artificial or natural) provide have become a key component of food manufacturing to create and market what consumers consider “natural” looking foods. It is economically efficient to produce standardized foods using automated machinery and standardized ingredients, including food dyes, in streamlined operations. Using fresh spinach or beet juice as food coloring is more expensive and more time-consuming than simply adding commercially manufactured color additives. Compared with making dyes from scratch using fruits and vegetables, standardized colors do not require special skill or knowledge, since operators can color foods by simply measuring the necessary quantity of color additives and pouring them into other ingredients, and the result is always the same. Standardized foods also provide a guarantee of consistent quality for many consumers who expect that any boxes of breakfast cereal will look and taste the same wherever and whenever they are purchased.

Consumer expectations about “natural” colors have become increasingly standardized partly due to new ways of advertising and retailing foods, beginning in the early twentieth century. The growth of national magazines, the expansion of national advertisements, and the increasing use of color printing provided consumers not simply with eye-appealing illustration but also with standardized visual references that they would recognize as the “natural” and “right” color of certain food products. The rise of self-service merchandising in the mid-twentieth century transformed the visibility of modern food stores into more colorful, uniform, and clean environments, while offering customers a set of standards for judging the freshness of foods largely based on the sense of sight.

The color of foods is not merely a physiological characteristic but a contested terrain where nature and technology intersect; business interests, government regulation, and consumer expectations compete; and taste and sight are intertwined. Color is only one feature of food products but it has a power to determine the marketability of foods, drive food producers to change their manufacturing operations, and make people hungry (or disgusted). We live in a world where “eye appeal is buy appeal.”<sup>10</sup> A history of how these two “appeals” became connected provides new insight into the rise of corporate capitalism, the industrialization of food production, and shifting consumer expectations about their everyday foods.

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<sup>10</sup> U.S. Slicing Machinery Company Advertisement, *Progressive Grocer* 14, no. 3 (March 1935): 146.



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## **Appendix**

### **REPRINT PERMISSION LETTERS**

A letter from the National Museum of American History, Smithsonian Institution:

Figures 7, 8, 9, 11, 12, 14, 15, 16, 17, 28

A letter from Paula Johnson, the Division of Work and Labor, the National Museum of American History, Smithsonian Institution: Figures 18 and 19



Smithsonian  
*National Museum of American History*

March 23, 2016  
Kenneth E. Behring Center

Ai Hisano Oda  
334 E. Main St. A5  
Newark, DE 19711

Dear Mr. Oda,

With this letter we are releasing two images from the Warshaw collection, five images from the Product Cookbook collection, one image from the Ayer collection and two images from the Work & Industry collections for use in the dissertation and e-publication "Eye Appeal is Buy Appeal: Business Creates the Color of Foods." In making this material available for the publication, the Smithsonian Institution makes no claims of ownership of the copyrights or related rights. In addition, we cannot affirm that there is no risk of liability from parties who may seek to claim copyright or related rights ownership. As the user you must understand and agree that the responsibility for ascertaining if such rights exist and for obtaining all necessary permission rests with you. In addition, we expect you to indemnify and hold harmless the Smithsonian Institution for all claims, actions, damages, judgments, and expenses that may result from the use of these images.

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Division of Work & Industry, National Museum of American History, Smithsonian Institution

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Sincerely,

Kay Peterson  
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202-633-3727 voice  
petersonk@si.edu

SMITHSONIAN INSTITUTION  
National Museum of American History  
Kenneth E. Behring Center  
14th Street and Constitution Avenue, NW  
PO Box 37012  
Washington DC 20013-7012



Smithsonian Institution

## Reproduction/Use Request

Archives Center

National Museum of American History

Name Ai Hisano Oda  
Address 334 E. Main St. A5 City Newark State DE Zip 19711  
Phone 302-824-3628 Fax \_\_\_\_\_ E-mail aihisano@udel.edu  
Institutional Affiliation University of Delaware

Project Description/Intended Use

I would like to use materials from the Archives Center, NMAH, for my dissertation submitted to the University of Delaware. My project examines the historical construction of the color of foods in the United States from the 1870s to the 1970s. By analyzing food coloring regulation, the manipulation of color by industry, and cultural expectations, the dissertation shows what American consumers today considered the "natural" color of foods is a product of political, economic, and cultural negotiations among various actors.

Publisher/Producer (if known) \_\_\_\_\_

Address \_\_\_\_\_

Phone \_\_\_\_\_ Fax \_\_\_\_\_ E-mail \_\_\_\_\_

Expected Publication/Broadcast/Opening Date: May 2016

Title of Publication/Production/Exhibit "Eye Appeal Is Buy Appeal": Business Creates the Color of

Material Requested (attach additional sheet if necessary):

Please see the attached sheet.

Permission to reproduce is contingent upon adherence to the conditions on the reverse of this form AND receipt of usage fee. I have read and agree to the conditions:

Signature: Ai Hisano Oda Digitally signed by Ai Hisano Oda  
Date: 3/9/2016  
Date: 2016.03.09 09:22:42 -0500

PERMISSION GRANTED BY:  Date: 3-23-2016  
Archives Center Staff Member



Materials Requested:

**Warshaw Collection**

- “Cookbooks,” box 1, United Fruit Company, “A Short History of Bananas and a Few Recipes for Its Use” (1904)
- “Dairy,” box 1, Bean & Perry Co., butter color trade card (n.d.)

**Product Cookbooks Collection**

Box 2, “Sunkist Recipes Oranges-Lemons” (1916)

Box 4, Fruit Dispatch Company, “From the Tropics to Your Table: Eighty-Three Tested Banana Recipes” (1926)

Box 4, General Foods, “Cake Secrets” (1953)

Box 11, “Rumford Fruit Cook Book” (1927)

Box 11, “Sealed Sweet Cook Book” (n.d.)

**NW Ayer Records**

Series 2, box 44, Fairmont’s Butter Advertisement (1925)

**Digital Collection**

MUPU Citrus Association, Orange Crate Label, c.1900-1940

[http://collections.si.edu/search/tag/tagDoc.htm?recordID=nmah\\_1362016&hlterm=orange%2Blabel](http://collections.si.edu/search/tag/tagDoc.htm?recordID=nmah_1362016&hlterm=orange%2Blabel)

Cascoa Growers, Apple Crate Label, c.1900-1940,

[http://collections.si.edu/search/tag/tagDoc.htm?recordID=nmah\\_1361639&hlterm=crate%2Blabels](http://collections.si.edu/search/tag/tagDoc.htm?recordID=nmah_1361639&hlterm=crate%2Blabels)



Ai Oda &lt;aihisano@udel.edu&gt;

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## Permission for using images

3 messages

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**Ai Hisano** <aihisano@udel.edu>

Tue, Mar 8, 2016 at 8:38 PM

To: "Johnson, Paula" <johnsonpa@si.edu>

Dear Paula

I hope this email finds you well.

I am writing to you to ask about the permission for using images in a dissertation. I would like to include images of the tintometer that you took for me last year ([http://americanhistory.si.edu/collections/search/object/nmah\\_864555](http://americanhistory.si.edu/collections/search/object/nmah_864555)) in my dissertation. Do I need to get written permission to use the image? If so, would you please write a permission letter? If I should ask someone else about permission, please let me know.

I'd greatly appreciate your assistance.

Best regards,  
Ai

Ai Hisano  
Ph.D. Candidate  
Dept of History/Hagley Program  
University of Delaware  
[aihisano@udel.edu](mailto:aihisano@udel.edu)  
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**Johnson, Paula** <johnsonpa@si.edu>

Wed, Mar 9, 2016 at 8:32 AM

To: Ai Hisano <aihisano@udel.edu>

Dear Ai,

This email message will serve as permission for you to use the referenced photograph in your dissertation. There is no fee for this, as it is a non-commercial use. However, should you wish to use the image in any future publications, web sites, or other media, that will count as a new request and you will need permission to use the image and, depending on the publication or platform, it may require a fee.

Best wishes on completing your dissertation. Let me know if I can be of any further assistance.

Best regards,

Paula

**Paula J. Johnson**

**Curator, Division of Work & Industry**

**National Museum of American History / MRC 629**

**12<sup>th</sup> and Constitution Ave. NW**

**Smithsonian Institution**

**Washington, DC 20560-0629**

**Mail: P.O. 37012 / NMAH MRC 629 / Smithsonian / Washington, DC 20013-7012**

**202-633-3908 / [johnsonpa@si.edu](mailto:johnsonpa@si.edu)**

**From:** Ai Hisano [mailto:[aihisano@udel.edu](mailto:aihisano@udel.edu)]

**Sent:** Tuesday, March 08, 2016 8:39 PM

**To:** Johnson, Paula <[johnsonpa@si.edu](mailto:johnsonpa@si.edu)>

**Subject:** Permission for using images

[Quoted text hidden]

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**Ai Hisano** <[aihisano@udel.edu](mailto:aihisano@udel.edu)>

To: "Johnson, Paula" <[johnsonpa@si.edu](mailto:johnsonpa@si.edu)>

Wed, Mar 9, 2016 at 11:28 AM

Dear Paula

Thank you very much for giving me permission and for your assistance. I will contact you when I want to use the images in my future publications.

Thank you again.

Ai

Ai Hisano

Ph.D. Candidate

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University of Delaware

[aihisano@udel.edu](mailto:aihisano@udel.edu)

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[Quoted text hidden]