“The Seven Spices: Pumpkins, Puritans, and Pathogens in Colonial New England”

For a multitude of North Americans ‘tuned in’ to the holiday traditions of mainstream United States (U.S.) culture, the culinary additions of the tastants vanilla, cloves, nutmeg, ginger, allspice, cardamom, and cinnamon likely evoke romantic thoughts of Thanksgiving or Christmas, or of colonial New England during the fall and winter seasons. “Eating,” write Turner and Thompson (N.d.:3), “is rarely divorced from social and cultural spheres.” Indeed, the essences that exude from culinary inclusions of combinations of these seven spices likely conjure up in many tradition-minded Americans visualizations of an archetypal and romantic ‘collective memory’—that of seventeenth-century Puritans and Native Americans sharing outdoor feasts across long tables for Thanksgiving beside Plymouth Rock in Massachusetts.

The seven seasonings “stimulate[] the taste buds of mouth and mind” (Cardina N.d.:2), and, for many in the U.S., bring to mind the distinctive tastes of recipes destined for decorating fall and winter dining tables, such as pumpkin or sweet potato pies. There are several ways to imagine how such sense-memory matrices are formed. As Berman et al. (2000:7017; see Bures et al. 1998) propose, “consumption of even a small amount of an unfamiliar tastant is a salient experience that may suffice to imprint a long-term memory of the new taste and its hedonic valence.” The authors’ findings offer evidence for this proposition: “a key role in the detection of … taste memory is played by the central gustatory area in the insular cortex (IC)” (Berman et al. 2000:7017; see Kiefer and Braun 1977; see Rosenblum et al. 1993, 1997; see Schafe and
Bernstein 1998). This, they explain, is due to the “encoding and consolidation” functions of noradrenaline, which the body uses to imprint “emotionally charged memories” (Berman 2000:7022; see Crow and Wendlandt 1976; see Cahil et al. 1994; see Przybyslawski et al. 1999). In sum, the olfactory senses instigate chemical changes in the brain and, thereby, impart mental associations and memories in individuals (Berman et al. 2000; Bernstein 2005).

Adopting a philosophical explanation, one might say that such mnemonic congruencies are formed as when Descartes’ res cognitae (‘thinking substances’)—conscious and subjective experiences, such as tastes and smells, mingle sensuously with res extensae (‘extended substances’)—the “objective world, which includes the physical body and universe, as well as plants[] and stones” (Tarnas in Greenfield 2008:158). It has been posed that “only in [humanity] did the two realities come together as mind and body” (Tarnas in Greenfield 2008:158; see Lupton 1994, Nestle 1998). Bernstein (2005:204; see Hasher et al. 1977) offers sensory “repetition primes … increase belief, a finding similar to the truth effect in which repeated statements are believed more than nonrepeated statements.” Experientially encountered in tandem, the essences of vanilla, nutmeg, cloves, cardamom, ginger, allspice, and cinnamon, when accompanied by history lessons and recurrent presentations at fall and winter holiday feasts, might be easily understood to have nestled comfortably into the ‘American collective’s’ cultural mythology.

I favor an alternate explanation—a process that is the focus of this paper: biocultural evolution. Following the biocultural evolutionary paradigm, and as exemplified by studies such as those performed by Sherman and Billing (1999:462; see Katz 1975, 1982) and others, the culinary practices of any particular group are suggestive of that group’s particular ecological circumstances. I concede to considering cookbooks as cultural archives. They are “written
records of our … races against … diseases” (Sherman and Billing 1999:462). I advance that New England families would fare better and beget healthier offspring if they included in their diets spices that could help them deal with some of the harsher aspects of their environments—pathogens (see Sherman and Billing 1999:461).

Some of the spices available in colonial America—cinnamon, vanilla, cardamom, ginger, cloves, and nutmeg—can hardly be called ‘American’ at all, in that their usage had been born of extant global spice trades and Native American cuisines already in place well before the 1600s (Corn 1998:247–248; see Meighan et al. 1958:137–138). All but one of the spices—allspice—were known to Europeans prior to their initial colonization of New England (see Meighan et al. 1958:137–138). Just as “the distinct flavors of southern food testify to the mixed cultural heritage of slave kitchens,” cooking in early colonial New England is highly influenced by the culinary lifeways common in Europe, as well as by those of the Native Americans (Eves 2005:283; see Harris 1989:xvi; see Sarah Kemble Knight 1963[1938]:437).³

“When you eat a piece of spicy pumpkin pie, baked beans[,] or corn bread, you are enjoying foods that originated in Early America. […] Since the first settlers were predominantly English, their early cooking reflected to a degree the foods in homes left behind, but necessity forced changes. Many foods previously used were not available in the new country” (Food Editors of Farm Journal 1976:3).
The Food Editors of Farm Journal (1976:3) inform readers that the Europeans’ “new neighbors, the Indians, were growing and eating several varieties of maize (corn), \(^4\) beans of many sizes and colors and different kinds of squashes, including pumpkins.”\(^5\) The Native Americans gifted squashes and pumpkins (\textit{Cucurbita pepo}) to the new arrivals at “Plimoth Plantation” generously,\(^6\) but the settlers found these \textit{Cucurbita} varieties bland (Stradley 2004:1; New York Times 1895:1). By the 1620s, cloves, nutmeg, cardamom, vanilla, cinnamon, and ginger had been distributed along the Silk Road and across the globe via transoceanic shipping routes for years (Corn 1998:247–248; Cardina 2004:xi–xiv). Allspice, indigenous to the Antilles Islands, was adopted by European New Englanders’ soon after their arrivals (Meighan \textit{et al.} 1958:137–138). Thus, accustomed to the seven spices under consideration, New Englanders took to ‘gussying up’ the natives’ offerings with those spices that were present in their respective cultures (Food Editors of Farm Journal 1976:3).

These seven ‘New England spices’’ availabilities were seasonal—dependent upon calendrical cycles. They were favorites in this region,\(^7\) particularly during the fall and winter months (See Appendix III). Culinary applications of these spices in the colonies seem to coincide with the final fall harvest and peak pumpkin-reaping seasons. Although pumpkin harvests were bountiful in this region, “herds of deer troubled early colonists and western pioneers,” for “when the pumpkins were ripe, the fleet animals moved in and hollowed them out leaving only the shells” (Food Editors of Farm Journal 1976:40). This was a serious loss, because pumpkins and winter squash were extremely important for their diets, as expressed by this ‘ditty’ written in New England in 1638 (Anonymous \textit{in} Food Editors of Farm Journal 1976:40):

“‘We had pumpkins in the morning
And pumpkins at noon

4
If it were not for pumpkins
We’d be undone soon.’’

Native Americans grew their squashes on tribal lands, and invented numerous ways to serve them. Since their squash-based recipes’ taste profiles were received lukewarmly by the sixteenth-century European settlers, the settlers soon spiced Cucurbita recipes to suit their tastes (Food Editors of Farm Journal 1976:3). The ‘Cooking’ sections of U.S. bookstores are now crammed with recipes for pumpkin pies, pumpkin muffins, pumpkin cookies—even pumpkin beer\(^8\)—derived from these first formulae. A good number of these and later recipes call for copious amounts of combinations of cinnamon, nutmeg, cloves, allspice, ginger, cardamom, and vanilla.

I parsed several cookbooks (Lind and Hockman-Wert 2005; Food Editors of Farm Journal 1976; Eves 2005) from beginning to end. I scanned the recipes featured on several webpages, including one entitled Fall Seasonal Spices (Stradley 2005; see Discover Bulk Foods 2011:1; see Fike 2011:1; see O Chef 2006:1). Other works (Daniels 1995; Food Editors of Farm Journal 1976; Miller and Johnson 1963[1938]a, 1963[1938]b; Crouch 2010; Coe 1994) aided me in my exploration of past culinary lifeways in America. The majority of the recipes I surveyed hail from colonial New England, one of the nation’s earliest and most dense population centers in the seventeenth-century. Here, at that time, the nation’s first publishing houses were founded.

The earliest ‘cook books’ became increasingly popular throughout the colonies during the fall and winter seasons when fresh foods were at a minimum (Cummings 1994:99; Anonymous 1859:1). Many recipes were conceived as preservation techniques (Fajardo 2011:20–21). The first “truly American cookbook” was assembled by Amelia Simmons, whose American Cookery was published in Hartford, Connecticut in 1796, and featured “the first printed recipe for
pumpkin pie” (Stradley 2004:1; Food Editors of Farm Journal 1976:4). The “Pompkin Pudding” recipes she published that year were “baked within a crust[,] and similar to present day pumpkin pies” (Stradley 2004:1). Simmons’ “Pompkin Pudding No. 1” calls for nutmeg, mace, and ginger; “Pudding No. 2” features allspice and ginger (Stradley 2004:1). Nearly a century and a half earlier, in the 1670s, the nearly anonymous W. M.’s *The Compleat Cook* (1677) was authored. It instructs the “Pumpion Pie” preparer to add “Cinamon [sic], Nutmeg … and six Cloves” (W.M. 2010[1677][1662][1658]; see Stradley 2004:1).


The Food Editors of Farm Journal (1976:98) claim that, in 1820s America, “the best compliment a woman received for her cake was ‘It tastes like pumpkin pie.’” Purporting to win women such kudos and likely to gain themselves clientele, the Nestlé company casts its Libby’s brand of pumpkin pie filling as an “American tradition, known for Thanksgiving pumpkin pie and other indulgent holiday favorites (Nestlé USA N.d.:1). The seven spices under survey don’t literally marquee the can labels of America’s ubiquitous standard, Libby’s pumpkin pie filling, nor are they listed as its ingredients on Libby’s website (Nestlé USA 2011:1). The recipe for Libby’s pumpkin pie filling is proprietary. Ginger, cinnamon, and clove do appear, however, in recipes that call for Libby’s pumpkin pie filling that are endorsed by its parent company, Nestlé
It may be the case that cinnamon, vanilla, nutmeg, ginger, cardamom, allspice, and cloves are implicitly catalogued within Libby’s oblique usage of the umbrella term, ‘spices’.

It is of interest for the purposes of this paper that Nestlé contends that Libby’s pumpkin pie filling is “now recognized for its superior nutrition benefits” (Nestlé USA N.d.:1). I offer the reader to consider the following by the close this paper: did the spices—just as much as the pumpkin recipes they embellished—safeguard the seventeenth-century New Englanders from pathological downfall? As Turner and Thompson (N.d.:3) caution, “to say that eating behavior draws on evolved or instinctual tendencies ignores the central roles that social learning, local ecologies, and cultural context play in shaping eating behavior.” Sympathetically, I argue there is no coincidence to these tastants’ visceral associations with Thanksgiving-day feasts in New-England: there is arsenic in the well-water there.

Sherman and Billing (1999:455) tell us that “a clue to the ultimate reason for spice use may lie in the protective effects of phytochemicals against plants’ biotic enemies.” In 1999, they published *Darwinian Gastronomy: Why We Use Spices* (1999). A primary portion of their overall methodology was to scan cookbooks and probe the catalogued culinary habits of nations for non-random patterns of spice use (Sherman and Billing 199:454–455). The researchers attempted to correlate complicated spice recipes and spicier (hotter) foods with tropical climates, where vectors and pathogen strains tend to be more virulent (Sherman and Billing 1999:453, 469–461; see Guégan et al. 2008). They ground their treatise: “spices have several beneficial effects, the most important of which may be reducing foodborne illnesses and food poisoning” (Sherman and Billing 1999:453). Spice-bearing plants’ phytochemicals help shield us from
illnesses (Sherman and Billing 1999:453, 455, 461). Sherman and Billing (1999:453) build upon the findings of Fraenkel (1959) and Walker (1994), and forward, “these “secondary compounds … evolved in plants to protect them against herbivorous insects and vertebrates, fungi, pathogens, and parasites.”

As for the beneficial properties of the spice additives under examination, Sherman and Billing (1999:455) have cited allspice as one of the three “most potent spices,” since it “inhibited or killed every bacterium [it was] tested on.” Elsewhere, they offer that cinnamon, cardamom, nutmeg, ginger, and cloves, too, are “highly inhibitory” against bacteria (Sherman and Billing 1999:456–457). They, like researchers before them, explain that “ginger and cinnamon have for centuries been used to counteract a broad spectrum of ailments, including dysentery, kidney stones, arthritis, and high blood pressure” (Sherman and Billing 1999:458; see Johns 1990; see Duke 1994). The phytochemicals of cloves and mace contain potent antioxidants, and can reduce the likelihood of cancers (Sherman and Billing 1999:460; Hirasa and Takemasa 1998:162; see Lin 1994). In these respects, cardamom, nutmeg, vanilla, cinnamon, ginger, cloves, and allspice might have possibly been adopted into the culinary lifeways of New England colonists to combat carcinogenic pathogens in their environments, as well (see Appendix I, Figure 1). Succinctly, Katz et al. (1982:172; Katz et al. 1975) have labeled such a process—one “in which biological evolution and adaption is supplemented and complimented by a variety of cultural adaptions”—biocultural evolution.

In a manner not unlike Sherman and Billing’s (1999), I set out to correlate culinary spice usage in New England and New York10—namely that of cinnamon, cloves, nutmeg, cardamom, allspice, vanilla, and ginger—with the region’s arsenic-laden ecology. I believe that the culinary additions of combinations of these spices are sensually reminiscent of this region for many
Americans due to New Englanders’ unintentional attainment of “dynamic equilibrium with environmental resources” (Katz 1982:175; see Lupton 1994; see Nestle et al. 1998). The seven spices may have been adopted into the early colonial New Englanders’ cuisine in order to fend off a particular vitamin deficiency—that involving thiamine, or vitamin B1. The onset of beriberi, a condition brought on by this deficiency, could have possibly been thwarted by these seven spices’ additions to the early colonists’ diets. These spices’ dietary inclusion might also have circumvented the effects of arsenic (chemical symbol As) poisoning.

Since arsenic intake hinders the body’s absorption of thiamine (vitamin B1), the colonial settlers would require extra amounts of this B vitamin in order to remain healthy (Arnold 2010:296). Cardamom, cinnamon, nutmeg, cloves, and vanilla contain significant amounts of B1—more so than many spices—in addition to containing varying amounts of eugenol and antimicrobial compounds (Lubinsky 2011:9–11; see Appendix IV, Table 1).11 Consumption of cardamom, cinnamon, cloves, vanilla, nutmeg, ginger, and allspice—especially had they been combined12—would have provided the settlers extra amounts of thiamine and, perhaps, subsequently coaxed more extensive inclusion of them throughout the New Englanders’ distinctive culinary fare (see Sherman and Billing 1999:458).

Arsenic-rich metamorphic rock aquifers are quite common throughout New England (see Appendix II, Figure 1). These aquifers’ mineral content has remained consistent since the Pleistocene (Ayotte 2003:2079–2080). They have provided countless New Englanders water for drinking, cooking, and irrigation since colonial times. The concentrations of As levels in the area that circumscribes New England, together with the regions of New York state which border it,
yield the highest levels of elemental arsenic in the U.S., save those of the state of Utah (see Ayotte et al. 2006).

The budding settlements of colonial New England would have needed to subsist on the pathogenic underground water sources available there, particularly in seasons of low rainfall, like fall and winter. Ayotte et al. (2003:2075) report that wells in Maine and New Hampshire, in particular, host “arsenic concentrations at levels of concern to human health” (see Appendix I, Figure 1 and Appendix II, Figure 1). Individuals in these states and across New England receive fifty-percent of their water from surface water; the other half is provided for them by bedrock and unconsolidated aquifers (Ayotte 2003:2075). These aquifers were “once inundated by marine water during the Pleistocene Glacial Maximum,” and “tend[] to have high pH values” (Ayotte 2003:2079–2080; Anderson et al. 2007:225–226, 229). Therefore, they contain substantial amounts of arsenic residue (Ayotte 2003:2079–2080).

The locations of wells fed by these aquifers radiate north by northwest, fifty to one-hundred miles distant from the Puritans’ disembarkation points—Plymouth, Massachusetts and Provincetown, Rhode Island. As of 2003, thirty-percent of them were private, and seventy-percent were public (Ayotte 2003:2081). Three hundred years ago, during the colonial period, they were likely all public. Just northwest, beyond this arc of arsenic-laced aquifers, three mountain ranges branch off and parallel the Appalachians—the White, the Green, and the Taconic. These three ranges connect New York, Connecticut, Massachusetts, Vermont, and Maine. Their foothills mark the extent of the Pleistocene Glacial Maximum’s reach (Ayotte 2003:2077, 2079; Anderson et al. 2007: 229–230). The rock type along this corresponding elevated range is consistently metamorphic (see Ayotte et al. N.d.:4; see Ayotte et al. 2003). The ranges are highly mafic (composed primarily of iron and manganese), and replete with granite
Groundwater held in granite wells typically contains high concentrations of arsenic, particularly in New Hampshire (Ayotte et al. N.d.:1; Ayotte et al. 2003). Granite aquifers are notorious for being reservoirs for metallic residue. Ayotte et al. (2003:2075) mention that where granite-lined aquifers are present, the “most common groundwater contaminants include iron and manganese, and arsenic.”

Further, it has been noted that “high concentrations of arsenic most often are found at the foothills of mountain ranges” (North East Arizona Energy Services Company 2004:1). Mahalanobis (2004:1) contends that “oxidation, reducing condition of aquifers, [and] organic inflow,” and the “leach[ing] out in aquifers due to microbial activity” can be “present in aquifer sediment for thousands of years.” Flood plains are notorious reservoirs for As contamination. Run-off from New England’s mountainous region produced flood plains close to where the Puritans had disembarked. As the Puritans moved into the North American hinterland, away from the coast and away from the Dutch, whom they thought often meddled too far into their spiritual affairs, they would have then depended on water collected from streams fed by As-rich run-off. Later, they would have relied on wells that tapped into granite aquifers. Both of these arsenic-heavy sources would have provided the early New England settlers water for drinking, cooking, crop irrigation, and bathing (Naidu et al. 2006).

Thus, unwittingly, the early settlers of the colony-cum-Republic, I reason, seasoned their dishes and desserts with spices that afforded them resilience against the insidious element, arsenic. They adapted their usages of cinnamon, nutmeg, cloves, ginger, allspice, and vanilla to their benefit, likely in response to their ecology. The added thiamine content of vanilla, nutmeg, cardamom, cloves, cinnamon, ginger, and allspice could have, hypothetically, halted, or softened, the malaise of arsenic poisoning, endemic in this region for centuries due to its
dependency upon this proliferation of As-rich aquifers (see Ayotte et al. N.d.; see Ayotte et al. 2003; see Ayotte et al. 2006; see Naidu et al. 2006).

In Appendix III, I compiled a chart that illustrates the prevalence of cardamom, cinnamon, vanilla, allspice, cloves, ginger, and nutmeg noted across all of the recipes I found in one of the cookbooks that I parsed ingredient by ingredient, Lind and Hockman-Wert’s (2005) Simply in Season. This cookbook was chosen for two reasons. First, as its title suggests, its recipes are divided seasonally—into “Fall,” “Winter,” “Spring,” and “Summer” sections (Hockman-Wert 2005). Second, it was the first of several cookbooks I had happened to pick from my shelves at home in order to sate my intellectual curiosity. I had just moments before experienced the inspiration for this paper, and the book coincidentally lent instant credence to a related hypothesis. It inspired me to investigate further.

The seven spices under discussion contain comparatively bountiful amounts of thiamine (see Appendix IV, Table 1 and List 1): nutmeg sports 0.346 mg and cardamom has 0.198 mg; cloves contain 0.115 mg; allspice’s, cinnamon’s, and ginger’s thiamine levels are somewhat lower, with levels of 0.101 mg, 0.077 mg, and 0.046 mg, respectively (Katzner N.d.b:1). Vanilla weighs in with the least amount, consisting of only 0.011 mg of thiamine, B1 (Katzner Nd.b:1). Mace, which began appearing more and more as the 1800s approached, had centuries earlier been featured in colonial recipes solely as an optional or replacement ingredient for its seed, nutmeg (Stradley 2004:1). Interestingly, it has the second highest thiamine content among the ‘colonial seven’: a whopping 0.312 mg (Katzner N.d.b:1). These facts warrant attention, if not only to propose that, as beriberi and arsenic morbidity rates rose, an increase in culinary usage
and ingestion of thiamine-rich mace might have caused the afflicted colonists to ‘feel better’ (see Sherman and Billing 1999:461; see Appendix IV, Table 1 and List 1).

Although the Puritans’ new diet sparked novel dietary changes that were beneficial for their health, gastronomically induced pathologies became apparent in the northeastern New World. Two scholars of Puritan literature, Miller and Johnson (1963[1938a:388), provide an entry from a seventeenth-century New England manuscript which perhaps illustrates the negative effects of the altered Puritan diets: ‘‘Men and Women keep their complexions, but lose their Teeth: the Women are pittifully Tooth-shaken 19; whether through the coldness of the climate, 20 or by sweatmeats of which they have store, I am not able to affirm.’’ That the Puritans’ complexions were ‘kept’, yet their teeth were ‘pitted’, might possibly expound upon the effects of the recent European arrivals’ altered diets. Pumpkins, bountiful in the region, contain large amounts of the collagen-replenishing vitamins, A and C. However, the new arrivals, likely forced by either scarcity or necessity to take on new foods, imported maize into their diets (World’s Healthiest Foods 2011:1; Hospitality Services Group 2011:1). 21 Maize, high in carbohydrates and sugars, would have assaulted the New Englanders’ teeth. Overindulgent corn consumption would have plagued the settlers’ teeth with caries, and, understandably, left the settlers ‘‘pittifully Tooth-shaken’’ (Goodman et al. 1984:25–29; Miller and Johnson 1963[1938a:388).

Thus, as Katz (1982:187) has suggested, to perceive adaptive human processes at work one “must begin to consider a holistic model that considers the entire food chain in both time and space.” All of the spices under discussion—cardamom, nutmeg, vanilla, cloves, allspice, ginger, and cinnamon—could have buffered the northeasterners from pathogenic levels of arsenic in New England’s groundwater. The spices’ culinary inclusions, timed with the New Englanders’
bountiful fall pumpkin harvests and holiday eating rituals, might have, over time, influenced their seasonal customs and culinary habits, and thereby ushered in an iconic presence among sentimental Americans. The flavorings became sensually catalogued as ‘holiday spices’, and embedded in the zeitgeist of our nation’s fall and winter holiday seasons. Explicit traces of such a biocultural evolutionary adaption, I propose, have dissipated. However, they can perhaps be evidenced by Americans’ present day romantic legends that speak of Puritans and Native Americans sharing *Cucurbita pepo* pies beside Plymouth Rock.
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Physick, Chyrurgery, Preserving and Candying, &c Which Were Presented Unto the Queen By the Most Experienced Persons of the Times, Many Whereof Were Had in Esteem, When She Pleased to Descend to Private Recreations: Corrected and Revised, with Many Additions: Together with Three Exact Tables. [Bound with] The Compleat Cook: Expertly Prescribing the Most Ready Wayes, Whether Italian, Spanish, or French, For Dressing of Flesh, and Fish, Ordering of Sauces, or Making of Pastry. London: E.B. for Nathan Brook, at the Angel of Cornhill

The World’s Healthiest Foods
Appendix I.

Figure 1: Coincidence of Arsenic Aquifers and Bladder Cancer. The following map, using black, indicates the coincidence of arsenic-rich aquifers and high bladder cancer rates in the United States (Source: Ayotte et al. 2006:170).
Appendix II.

Figure 1: Arsenic Concentrations in New England Wells. Map illustrating the locations, in 2003, of public-supply wells in New England with high arsenic concentrations as reported by Ayotte et al. (2003:2076). High arsenic concentrations are indicated with red circles (Source: Ayotte et al. 2003:2076).
Appendix III. Examplar Recipe Matrices and Additional Notes.

"Autumn" Recipes (Lind and Hockman-Wert 2005) (out of 54/4.57 = total recipes):

<table>
<thead>
<tr>
<th>Cinnamon:</th>
<th>Nutmeg:</th>
<th>Ginger:</th>
<th>Vanilla:</th>
<th>Cloves:</th>
<th>Cardamom:</th>
<th>Mace:</th>
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Observations:
1. Cinnamon and vanilla tend to be paired in recipes.
2. As the non-desert recipe section segues into dessert formulae, the first eight spices are more prevalent.
3. I do not count ingredients such as orange juice or lemon juice as lemon or orange zest/peel for the purposes of this paper. They are not ‘spices’, and are only included to represent the recipes in their entirety.

"Winter" Recipes (Lind and Hockman-Wert 2005) (out of 49/5.04 = total recipes):

<table>
<thead>
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<th>Cloves:</th>
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<td>2</td>
<td>0</td>
<td>3</td>
<td>0</td>
</tr>
</tbody>
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1. Cinnamon and vanilla tend to be paired in recipes.
2. As the non-desert recipe section segues into dessert formulae, the first eight spices are more prevalent.
3. I do not count ingredients such as orange juice or lemon juice as lemon or orange zest/peel for the purposes of this paper. They are not ‘spices’, and are only included to represent the recipes in their entirety.

"Spring" Recipes (Lind and Hockman-Wert 2005) (out of 48/5.15 = total recipes):

<table>
<thead>
<tr>
<th>Cinnamon:</th>
<th>Nutmeg:</th>
<th>Ginger:</th>
<th>Vanilla:</th>
<th>Cloves:</th>
<th>Cardamom:</th>
<th>Mace:</th>
<th>Allspice:</th>
<th>Lemon/Orange Peel:</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>1</td>
<td>7</td>
<td>5</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
</tbody>
</table>

Observations:
1. Ginger and vanilla are often paired together in the “Spring” recipes (Lind and Hockman-Wert 2005).

"Summer" Recipes (Lind and Hockman-Wert 2005) (out of 96/2.57 = total recipes):

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>3</td>
<td>5</td>
<td>6</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
</tbody>
</table>

Observations:
1. Squash-based recipes in the “Summer” section rarely feature the seven spices, unlike recipes for preparing their “Autumn” and “Winter” cucurbita relatives (Lind and Hockman-Wert 2005).
2. The incidence of cucurbita recipes are equally distributed among all four seasons. There are just as many squash recipes in “Spring” and “Summer” sections for squashes as there are for pumpkin and butternut varieties in “Autumn” and “Winter” (Lind and Hockman-Wert 2005).

Numerical figures in green equal weighted values against a total of two-hundred and forty-seven (247) recipes.
Appendix IV.

Table 1: Thiamine Contents of Cinnamon, Nutmeg, Cloves, Mace, Ginger, Vanilla, Allspice, Cardamom, and Lemon Peel (Source: Katzner N.d.a:1; Katzner N.d.b:1).

<table>
<thead>
<tr>
<th>Seasoning</th>
<th>eugenol</th>
<th>thiamine [B&lt;sup&gt;1&lt;/sup&gt;]</th>
</tr>
</thead>
<tbody>
<tr>
<td>cinnamon</td>
<td>✓</td>
<td>0.077</td>
</tr>
<tr>
<td>nutmeg</td>
<td></td>
<td>0.346</td>
</tr>
<tr>
<td>cloves [mace]</td>
<td>✓</td>
<td>0.115 [0.312]</td>
</tr>
<tr>
<td>ginger</td>
<td></td>
<td>0.046</td>
</tr>
<tr>
<td>vanilla</td>
<td>✓</td>
<td>0.011</td>
</tr>
<tr>
<td>allspice</td>
<td>✓</td>
<td>0.101</td>
</tr>
<tr>
<td>cardamom</td>
<td>✓</td>
<td>0.198</td>
</tr>
<tr>
<td>lemon zest [lemon peel]&lt;sup&gt;27&lt;/sup&gt;</td>
<td></td>
<td>0.060–0.124</td>
</tr>
<tr>
<td>mace [cloves]</td>
<td></td>
<td>0.312 [0.115]</td>
</tr>
</tbody>
</table>

List 1: The following list, in descending order according to levels, summarizes these ‘seasonal seasonings’ thiamine (B<sup>1</sup>) contents (Source: Katzner N.d.a:1):

1. nutmeg [0.346]
2. cardamom [0.198]
3. cloves [0.115]
4. allspice [0.101]
5. cinnamon [0.077]
6. ginger [0.046]
7. vanilla [0.011]
Appendix V.

Figure 1: Arsenic-Stricken Hands. The following picture reveals the bluish-tint and blackish spots that can cover the bodies of those who suffer extreme cases of arsenic poisoning (Source: balwant 2010:1).
Endnotes:

1 At this time, ginger, cloves, nutmeg, cardamom, cloves, and vanilla, for example, could be found in recipes spanning from Europe to China (see Weiss 2002).

2 Eves (2005:283) explains further: “Even when the food in question was of European origin, slave cooks produced them according to their own taste[s] and techniques—adding spices and vegetables to the typical protein and carbohydrate diet of Europe.”

3 In 1704, Sarah Kemble Knight (1666–1727) (In Miller and Johnson 1963[1938]:437) opined that her other fellow Puritans were “[b]ut too indulgent (especially y² farmers) to their slaves: suffering to great familiarity with them, permitting y²m to sit at Table and eat with them [sic].”

4 Although the Puritans’ new diet sparked novel dietary changes that were beneficial for their health, other pathologies became apparent in the northeastern ‘New World’. Two scholars of Puritan literature, Miller and Johnson (1963[1938]:388), provide an entry from a seventeenth-century New England manuscript which perhaps illustrates the negative effects of the altered Puritan diets: “Men and Women keep their complexions, but lose their Teeth: the Women are pittifully Tooth-shaken.” This shall be discussed briefly later in this paper.

5 *Cucurbita* seeds begin to populate the archaeological records of pre-Columbian Peru and Mexico around 3,000 B.C.E and 5,000 B.C.E, respectively (Heiser 1965:938; Harshberger 1896:890–891; Miller 1989; Whitaker 1983; Hospitality Services Group 2011:1). In addition to eating *Cucurbita pepo* varieties, the Natives Americans dried and tore strips from them and “wove them into mats” (University of Illinois Extension 2011:1).

6 One of the earliest journals written in America was authored by Dutch General James G. Wilson. He visited the Seneca and Mohawk in 1684, and memorialized his visit with the following passages:

“We had a good many pumpkins cooked and baked, that they called *anonsira*” (New York Times 1895:N.d.).

“We slept in his house, ate heartily of pumpkins, bear’s meat, and venison, so that we were not hungry, but were treated as well as they possibly could do” (New York Times 1895:N.d.).

7 The following account, provisioned during the Civil War, conveys some nineteenth-century northeasterners’ cultural—if not emotional—connectedness to New York state’s pumpkins (*Cucurbita pepo*):
“Returning, we will take up a load of these soft-shelled pumpkins. They are not the sort that City housewives grumble about; soft, smooth and yellow without, but within a congeries of strings and seeds that make no better pies than so much stocking yarn properly soaked in milk and molasses would, but they are the choicest species of Cucurbita Pepo that ever a home-sick Yankee fancies in his dreams that he is eating at home” (Anonymous 1852:N.d.).

8 Crouch, for example, contends, “American Brewers have a long history of brewing with pumpkins and squash […] [and] employ[ed] a variety of spices, including nutmeg, cinnamon, ginger, and allspice” (Crouch 2010:189).

9 The pumpkin cake recipe in Great Home Cooking in America has only one of the ingredients under discussion: vanilla (Food Editors of Farm Journal 1976:99–100).

10 For the purposes of this paper, in deference to its geological and geographical foci, I consider New England to consist of Maine, New Hampshire, inland Vermont, and the coastal regions of Massachusetts, Connecticut, and Rhode Island. I subsume New York State, as well, bordering as it does much of New England, and, thus, sharing in portions of both its geography and demographics.

11 Some of these spices were even mixed with water for use as a mouthwash or a lubricating salve (Krodl 2008:6; Garland 2006:48; see Sherman and Billing 1999:458).

12 Sherman and Billing (1999:458) report that “many … spices exhibit greater antibacterial potency when they are mixed rather than used alone.”

13 The Puritans’ landing points were chosen in desperation. The Dutch had already colonized the regions nearby. In 1620, an agreement entitled The Mayflower Compact was signed, and effectively leased the two towns to the new arrivals from England (Rolwing 2007:36–37; Miller and Johnson 1963[1938]:b:149–151). The Puritans soon mingled among the indigenous Native Americans, whom had already become accustomed to the Dutch. The Spanish were encountered, as well, for they had already substantially colonized southern portions of North America a century earlier, in the 1500s (Mintz 1985:31–32).

14 On her passage to Stamford—“a well compact town”—Puritan Sarah Kemble Knight (1666–1727) remarked about her frenetic journey through the hummocks beyond them:

“and Descending the Mountainos passage that almost broke my heart in ascending … we passed … Bridges which were exceedingly high and very tottering and of vast Length, steep and Rocky Hills and precipices (Buggbears to a fearful female traveller)” (Knight 1963[1704]:444).
Interestingly, the Dutch later traded their stakes in this area as well as that of New Amsterdam to the British for the British’s holdings in nutmeg plantations (Weiss 2002:87).

In the colonial era, boiling was the preferred method for heating food, and some colonists even contracted illnesses from the metallic impurities in their cookware (Lessler 1988:80–81; see McCord 1953).

Miller and Johnson (1963[1938]:388) mention that, for Puritans, “bathing was a luxury.”

Bluish hues and lavender speckling can make startling visual appearances on the skins of those suffering from arsenic poisoning (see Appendix V, Figure 1).

Authors Miller and Johnson (1963[1938]:388) further offer, “False teeth were not common, and the toothbrush was only introduced in 1718.” “But,” they add, “the salt and water solution used as a dentifrice was no doubt quite as adequate as any devised today” (Miller and Johnson 1963[1938]:388).

This correlates with an explanatory model widely held by the Puritans concerning ‘coldness’: “As for ventilation, quite possibly the bedrooms in winter received only such circulation of air as large fireplaces could supply, since chilly air was thought to be poisonous” (Miller and Johnson 1963[1938]:388). Arthur Kleinman (1988:16) contends that Americans’ own ‘pathognomic understandings’ are “based on grand cultural convention[s] that would make ‘feed a cold, starve a fever’ incomprehensible to someone without this shared local knowledge” (see Helman 1978).

Heiser, speaking of North America’s soil horizons, notes, “squashes, pumpkins and gourds are second only to maize in wealth of archeological material” (Heiser 1965:937; Whitaker and Davis 1962; see Miller 1989).

This book’s authorship is hazy. Stradley (2004:1) cites from the reprinted 2010 version. Writer Ivan Day (1996:10), who admits to owning a seventeenth-century version of this work, offers, “This manuscript receipt book, which is in my possession, is of unknown provenance, but has a pen trial dated 1677 in the margin of one page.” Day’s is likely either the original 1658 edition or a reprint from 1662. The two latter editions were published in London at the Angel of Cornhill at behest of Nathan Brook. The work has been scanned in its entirety, and can be viewed at Project Guttenberg’s website: http://www.gutenberg.org/files/10520/10520.txt.

I include here the peels of citrus fruits since they were optional ingredients in many of the recipes I examined that called for cinnamon, vanilla, cardamom, nutmeg, mace, ginger, and allspice. Ascorbic acid-rich citrus juices and extracts are capable antimicrobial agents (Sherman and Billing 1999:458; see Booth 1989). They are sometimes
used in the preservation of foods (see Booth 1989). The inclusion of ascorbic acid in recipes can augment the beneficial effects of other ingredients (Sherman and Billing 1999:458).

24 See Vegan Nutrients Project (N.d.) for more information on the thiamine content of foods.