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## Comparative Cosmetic Costs: Ancient Roman and Modern American Self-Adornment

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## Abstract

Women's cosmetic expenditures and use have been the subject of much interest and comment since the ancient Roman times. Using descriptions of cosmetics from ancient sources paired with modern scientific analysis and experimental archaeology techniques would allow the recreation of ancient cosmetic foundations. With reference to the prices given by Diocletian's Price Edict of 301 AD, the income share dedicated to cosmetics can be approximated for the ancient Roman woman. Comparing these numerical values to the expenditures of modern women presents an intriguing perspective on women's continued application of cosmetics.

**Keywords:** cosmetics, economics, Romans, tradition, costs

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Cosmetics have long been considered a key method of performing femininity in Western culture, and while the ingredients and application methods have changed over the centuries, the available evidence suggests that women's expenditures on cosmetics have remained relatively stable since the start of the Roman Empire. Modern chemical analysis of preserved cosmetics corroborates the recipes found within Ovid's *Medicamina Faciei Femineae* and Pliny the Elder's *Natural History*. Using these recipes and the prices and wages from Diocletian's *Price Edict* (301 AD), it is possible to approximate the relative costs of common cosmetics in the Roman world, thereby determining their relative affordability.

Roman women's cosmetic traditions centered on the conception of the female as an object "that needs to be fixed,"<sup>1</sup> as evidenced by the Latin term for cosmetics: *medicamen* described cosmetics, poisons, and remedies.<sup>2</sup> Foundations were applied to create a pale, regular complexion, "very much desired," as a demonstration of the woman's health and position within the leisure class.<sup>3</sup> Rouge was also commonly used to mimic a healthy blush; kohl was utilized to line the

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<sup>1</sup> Richlin 2014, 194.

<sup>2</sup> Olson 2009, 309.

<sup>3</sup> Olson 2009, 294.

eyes as well as darken the eyebrows.<sup>4</sup> Roman women's patterns of makeup application are clearly similar to modern applications- however, Roman cosmetics utilized a wider variety of unspecialized ingredients.

Surviving samples of Roman foundations range from the fourth century BC to the second century AD (Fig. 1).<sup>5</sup> Sparse remnants of foundation are typically found in *pyxides* (singular: *pyxis*) made of wood, glass, or ceramic; samples from these ancient cosmetic containers can then be tested through pyrolysis, electron microscopy, and x-ray diffraction. According to these analyses, lead white -- *cerussa*, in Latin -- was frequently utilized to create a pale complexion, although "white earths such as kaolin, lime, chalk or gypsum," or white tin could be utilized to similar effect at a lower cost.<sup>6</sup> Ring white, a calcium carbonate pigment made with the same glass as cheap Roman rings, could also be used. Pliny the Elder corroborates the use of ring white "to give brilliance of complexion in paintings of women," ambiguously referring both to portraits and daily cosmetic use.<sup>7</sup> Animal and vegetable fats were added to a foundation's powder base, binding the ingredients together and easing application.<sup>8</sup> Ovid recommends an expensive overnight poultice of vetch, barley, egg whites, dried and ground to a powder, which would then be mixed with the first shedding of "hart's-horn," to create a smooth complexion.<sup>9</sup> Modern scientific analysis offers uncertain recipes for recreating ancient Roman foundation. However, the details gleaned through comparison to the vague recipes of ancient male authors does allow for the determination of popular ingredients.

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<sup>4</sup> Olson 2009, 296 & 298.

<sup>5</sup> Evershed et. al. 2004, 35; Welcomme et. al. 2007, 552

<sup>6</sup> Welcomme et. al. 2007, 555

<sup>7</sup> Pliny the Elder, *HN* 35.30.

<sup>8</sup> Evershed et. al. 2004, 35.

<sup>9</sup> *Ov. Med.*; see Table 3 for cost calculation.

Before considering cosmetics' relative income shares, it is important to note that ancient and modern cosmetic expenditures cannot be directly compared. Roman cosmetic ingredients were sold by *pigmentarii* as *medicamina*, alongside paint pigments and medicines.<sup>10</sup> Whereas modern cosmetics are highly specialized in their ingredients, retail, and application, *medicamina* were multipurpose, generally made with easily-obtained ingredients. Red ochre is one of the best examples, used to soothe inflammation as a poultice as well as paint walls and faces.<sup>11</sup> The eyes and brows could be darkened using oiled wood from the hearth (Fig. 2); lead white could be obtained by dissolving lead shavings in vinegar.<sup>12</sup> As these examples demonstrate, common cosmetic ingredients were easy to obtain in comparison with those used in modern products. Lastly, modern cosmetic prices include the costs of production, safety testing, marketing, and other business activities that were not operative in the Roman era. Bearing these market distinctions in mind, it is nevertheless intriguing to approximate the average Roman woman's daily expenditure on cosmetic goods.

According to a 2016 survey by the cosmetic retailer SkinStore, women use an average of 16 different cosmetics daily, spending an average of \$8 per day;<sup>13</sup> in the same year, women earned a median of \$107 per day<sup>14</sup>. Assuming daily application, these women spend an average of 7.5% of their daily income on cosmetics. However, because the survey was conducted by an online cosmetics retailer, it is safe to assume that these respondents may spend more time, money, and effort applying cosmetics than the average woman. According to the United States Bureau of Labor Supply's (BLS) 2016 Consumer Expenditure Survey, consumers dedicate an average of

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<sup>10</sup> Olson 2009, 304.

<sup>11</sup> Pliny the Elder, *HN* 35.13.

<sup>12</sup> Pliny the Elder, *HN* 35.13.

<sup>13</sup> Skinstore, 2016.

<sup>14</sup> Bureau of Labor Statistics, 2016a.

1.2% of their income to “personal care products and services.”<sup>15</sup> Although this value more accurately reflects the expenditures of the average consumer on cosmetic goods, the BLS estimate is too broad to be serviceable in this paper. Their estimate includes both genders’ expenditures on products and appliances for hair care, hair removal, oral hygiene, and services, whereas this paper emphasizes *women’s* expenditures solely on *cosmetic goods*, especially makeup.<sup>16</sup> As such, although the estimated income share of 7.5% from the SkinStore survey is indeterminably biased upward, it is a more appropriate estimate than the value obtained from the BLS Consumer Expenditure Survey.

Calculating the average Roman woman’s expenditures on cosmetics cannot be accomplished so directly. Modern technology has made the spending habits of individual women on individual items easily accessible. For the Roman era, however, costs can instead be estimated, first by examining the raw ingredients, as observed through analysis of a preserved *pyxis* of foundation from the third century B.C.E.<sup>17</sup> Using this data in conjunction with the recipes described above, common ingredients of Roman cosmetic foundation may be determined.

Prices may then be estimated from those given in the *Edict of Maximum Prices*, issued in the fall of 301 A.D. by Emperor Diocletian. Diocletian’s *Edict* has been described as an “idealised measure,” attempting to restore “socially just ratios between wages and prices,” following centuries of unchecked coin debasement and inflation.<sup>18</sup> However, it is important to note that the listed values may “represent underestimates for realistic prices,” especially in light of regional economic fluctuations.<sup>19</sup> Ultimately, the *Edict* may reflect imperial ideals regarding market

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<sup>15</sup> Bureau of Labor Statistics, 2016b.

<sup>16</sup> Bureau of Labor Statistics, 2015.

<sup>17</sup> Welcomme et. al., 2007, 552.

<sup>18</sup> Williams 1985, 131.

<sup>19</sup> Corcoran 1996, 225.

activity, rather than realistic ratios; however, its complexity and completeness render it immensely helpful for cost explorations.

Proportions for the recipes were approximated through simple archaeological experimentation using modern ingredients. The simplest Roman cosmetic recipes called for olive oil mixed with a white powder material -- such as lead white, as mentioned above. In experiments, a foundation made of 1 part olive oil to  $1\frac{2}{3}$  parts starch most closely mimicked the apparent texture of ancient Roman cosmetics, relying upon the photos of a Greek cosmetic powder from Demetrias to determine the final texture (see also Figure 1 and 3; Table 1).<sup>20</sup> Testing these proportions required a careful hand, as even minor additions of either ingredient caused significant changes to the foundation's texture, likely as a result of the small batch.

Although experimentation only yielded a small amount of cosmetic material, the proportions are assumed to remain constant in the making of larger quantities of foundation. Table 2 shows the calculation of the prices for the estimated ingredient needed to make one Roman pound (348g) of the cosmetic, using the same ratio of 1:1 $\frac{2}{3}$ . For the lowest quality foundation, made of pork fat and chalk in a ceramic jar, one pound would cost 13 denarii to produce. For the middling quality, made with mastic gum and chalk in a wooden pyxis, 61 denarii. For the highest, made of white mastic and *cerussa* in a wooden pyxis, 112 denarii. In each case, the binding material is far more expensive than the pigment. For example, the chalk needed for a pound of foundation chalk costs only 4 denarii, while pork fat, the cheapest binding ingredient, costs 8 denarii (Table 2). In light of the lack of preservatives, this foundation would likely spoil quickly, and as such, women likely purchased their cosmetics in much smaller *pyxides* and not by the pound. Assuming foundation retailed in *pyxides* of 3.5g each, this would lead to an

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<sup>20</sup> Welcomme *et al* 2016, Figure 1.

estimated retail price of 0.2 denarii per *pyxis* of the cheapest formula; the most expensive foundation would retail at 2 denarii.

According to the *Price Edict*, low-skilled laborers could be paid a maximum of 25 denarii per day<sup>21</sup>. Women's participation in the workforce was limited primarily by "cultural conventions and institutional factors," and as such, these limitations were primarily operative for socially elite women.<sup>22</sup> Thus, it is reasonable to assume that non-elite women were employed at the same wage rates as their male counterparts. Even for a woman with expensive tastes earning low wages, she could spend only 8% of her daily income on a 3.5g *pyxis* of high-quality foundation. If she compromised and purchased the lowest quality, she would only spend 0.8% of her daily income for a *pyxis* of foundation. Blushes and eye shadows could presumably be acquired at similar costs, though the included pigments may have driven prices marginally higher. However, the *Price Edict* only offers the maximum legal price for an item, and as such, may not reflect the effects of price fluctuations below these values. As such, one may reasonably presume that variations in wages or material costs could significantly alter the percent of daily income dedicated to cosmetics. In addition, these experiments and calculations offer only a rough estimate of the potential costs of Roman cosmetics, and does not address the added costs of complementary goods, such as cosmetic brushes and cleansers. Even so, it is obvious that women at every income level could have had access to cosmetics, whether made at home or purchased from a local *pigmentarius*.

Cosmetics have remained central to the social performance of femininity for millennia but have received relatively little direct study. Roman authors, such as Ovid and Pliny the Elder, offer incidental descriptions of cosmetics in their writings, minimizing women's daily use of cosmetics

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<sup>21</sup> Kropff 2016, 18-23.

<sup>22</sup> Holleran 2013, 313.

in favor of detailing the ingredients' other effects. Ancient and modern women applied makeup in similar patterns, seeking to emphasize natural beauty through creating a smooth complexion and emphasizing the eyes, brows and lips. In addition, expenditures on cosmetic goods seem to have remained relatively similar across the millennia, in spite of the dramatic changes in market structures. Modern cosmetic ingredients are developed for a highly specialized market, while in contrast, Roman cosmetics relied on the repurposing of commonly available ingredients.

Scientific analysis of preserved *pyxides* has demonstrated that the use of plant starches and fats, as well as natural earths and animal-derived products, which are found in Roman foundations, can all easily be obtained through local markets. These findings rely on costs calculated through the performance of experimental archaeology, and in light of the imperfect data available from ancient sources, the calculated income shares are similarly imperfect. However, it logically follows that modern women spend a far greater share of their income on cosmetic goods than Roman women, given the diversification of product offerings and ingredients, as well as how rapidly modern cosmetic trends may shift. The stable income share dedicated to self-adornment suggests that cosmetic application remains a key component of women's daily gender performances. In spite of the millennia between ancient Roman and modern American women, and the changes in cosmetic technologies and cultures that have occurred, analyzing the economics of cosmetics demonstrates that self-adornment has remained a central aspect of the cultural performance of femininity.



## Tables and Figures

<b>Experimental Results</b>	Corn Starch	12.5ml	62.50%
	Olive Oil	7.5ml	37.50%
	Total	20 ml	100%

Table 1. Formula results from foundation experiments.

Cost Calculations			
	Price Range	Ingredients	Cost per pound (denarii)
Foundation	Cheap	Pork fat	8
		Chalk	4
		Ceramic jar	2
		Total	13
	Midrange	Mastic gum	50
		Chalk	4
		Pyxis	7
		Total	61
	Elite	White mastic	94
		Ceruse (asiatic)	5
		Pyxis	14
		Total	112

Table 2. Cost estimates, assuming experimental proportion of starch and fat. Costs are drawn from Diocletian's *Price Edict* (301 AD). Costs are given in *denarius communis*; weight in Roman pounds, equal to 327.45 grams.<sup>23</sup>

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<sup>23</sup> Kropff 2016, 5.

Ingredient	Price (denarii)	Quantity
Vetch	30	1 army <i>modius</i>
Barley	60	1 army <i>modius</i>
Egg whites (10)	10	10 egg whites
Velvet of first shed hart's horn	25	
Narcissus' roots	30	6 roots
Gum	6	2 oz
Thural seeds	10	
Honey	24	1 <i>sextarius</i>
Total	<b>195</b>	

*Table 3.* Cost approximation for the recipe provided by Ovid's *Medicamina Faciei Femineae*.

1 army modius = 12.93 l

1 sextarius = 546 ml



*Figure 1.* The preserved third century *pyxis*, found preserved under a temple in London in 2004; originally from Demetrias, Greece. Photo from “Foundation of a Roman cosmetic,” by R.P. Evershed, R. Berstan, F. Grew, M. S. Copley, A. J. H. Charmant, E. Barham, H. R. Mottram, G. Brown.



*Figure 2.* Experimental setup for creating oiled hearth wood. Shave oak twigs in metal dish, lit with matches until slightly burnt. Once cooled, the largest remaining pieces were coated in olive oil. (Photo: Abagael Rudock)



*Figure 3.* Early round of experimentation. Inclusion of cinnamon rendered the foundation too dark for personal use, as well as drying the mixture. Initial discovery of approximate oil and starch ratios, as recorded in Table 1. (Photo: Abagael Rudock)

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