

Sculptural Sugar Subtleties

The Evolution of Art from Medieval Medicine

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1/28/2012

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1 Introduction

Confections and sweet treats of various kinds have long held an important role in Western society. Most medievalists are familiar with subtleties made from cakes or similar baked goods. This paper focuses on sculptured sugar subtleties, a medieval and Renaissance art form that evolved from medicine rather than cooking

2 Sugar Sculpture in History

A modern pastry kitchen uses standardized terms for cooks established in the late 19th century by Augustus Escoffier. From Escoffier we get the terms *pâtissier* (pastry chef- head of the pastry/dessert team), *boulangier* (baker) , *confiseur* (confections) and *décorateur* (show pieces).¹ These terms are still in use in kitchens and bakeries all across Europe. While each discipline is an art with a specific set of skills, there is a great deal of cross-pollenization among workers.

Of Escoffier's classifications, the *confiseur* and the *décorateur* are probably the most visually well known. The *confiseur* works the chocolate and poured sugar sculptures. The *décorateur* makes specialty cakes. Television programs such as "Ace of Cakes", "Food Network: Extreme Challenges" and "Cake Boss", have exposed many of the confectionery tricks of the trade. A wide range of the population now knows what goes on under the pretty covers of modern pastry. Words such as gum paste, fondant and support structures have become part of our everyday vocabulary.

The modern understanding of confectionary arts is effectively unaware of the role that confections and confectioners have played in Western society. These days, people equate the term confection almost exclusively with dessert. But this was not always the case.

The root of "confection" is Latin, *confectiō* a preparing; *conficere* to produce.² In medieval Europe, the confectioner was responsible for making up medical compounds known as "comfits," often using sugar as a vehicle for delivery. It was much easier to swallow bitter herbs when wrapped in a compound of sugar.

¹ Gisslen, Wayne. *Professional Cooking*. Hoboken, NJ: John Wiley & Sons, 2011. Print.

² "confection." *Collins English Dictionary – Complete & Unabridged 10th Edition*. HarperCollins Publishers.

Sugar needs special handling in order to be turned into confections. Boiling sugar for syrups and candies is and always has been an exact science. In the Middle Ages and Renaissance, unique pieces of equipment were needed to produce comfits. In addition, the skill set required to produce confections was highly specialized and was usually outside of the abilities of the average cook. Spicer-apothecary members of the Worshipful Company of Grocers produced and provided confections for general consumption.³ In late fifteenth century England, the official title of the apothecary for King Henry V was "Serjeant Confectioner."⁴

The art and trade of the apothecary confections was passed from master to apprentice through the guild system for hundreds of years. However, by the middle of the 16th century, books containing confectionery instructions were being written aimed at the lady of the household. Sixteenth century housewives were expected to have some medicinal knowledge for keeping their household healthy. Alexis of Piedmont's book "*Secrets*," published in 1557, contained recipes and techniques for producing confections. While it was written from a medicinal view point, it was one of the first texts to reveal the secrets of the confectionery community and make them available to the general public.

The Treasurie of Commodious Conceits and Hidden Secrets by John Partridge (1573) was the first text designed to give insight to 'banqueting stuffes,' the secrets and recipes used by apothecaries to provide pleasure and entertainment. Partridge attempted to dispel the illusions created by guilds and make the culinary secrets available to everyone. 'to Frame/A happy common weal:/And which at large reveals,/That tyme dyd long conceal,/ To pleasure everyone'⁵

Other texts followed, also aimed at the housewife. Titles included *Closet for Ladies and Gentlewomen* (anonymous 1602), *Delights for Ladies* by Sir Hugh Platt(1605), *The English Huswife* by Gervase Markham (1615) and *A Daily Exercise for Ladies and Gentlewomen* (1617). These books separated the sugar work into categories: those sugar works needed for medicine and those used to create entertainment. With these new publications, housewives were able to produce replicas of dishes, cups,

³ "Origins & History The Worshipful Society of Apothecaries of London." *Homepage*. Society of Apothecaries. Web. 17 Jan. 2012. <<http://www.apothecaries.org/index.php?page=6>>.

⁴ *Calendar of the Patent Rolls Preserved in the Public Record Office: Edward IV, Henry VI, A.D. 1467-1477*. London: H. M. Stationery Office, 1900. Print. p.1427

⁵ Wilson, Constance Anne. "*Banqueting Stuffe*": *The Fare and Social Background of the Tudor and Stuart Banquet : [proceedings of The]*. Edinburgh: Edinburgh UP, 1991. Print.

plates, keys, hats, shoes and other household items created from sugar paste for the sole purpose of delighting and amusing one's guests.

Sugar paste, one of the essential tools of the apothecary's trade, was an excellent modeling and building material. Using various formulas of sugar paste, the applications were limited only by the imagination and the confectioner's ability to work with the material. It was not uncommon for confectioners to work with court artisans to produce larger works of art for special occasions.

In 1574 a banquet was held for Henry III of France as he passed through Venice on the way to his coronation in France. Sugar sculptures were presented at that banquet, based on designs by sculptor Jacopo Sansovino and executed by local apothecary Niccolo della Cavalliera. Among the sugar creations were sugar people, animals, plants, fruit, napkins, bread, plates and cutlery.⁶

In 1600 Maria de' Medici married Henri IV in Florence, by proxy. The king may have missed the wedding, but a life sized sugar replicas of Henri IV and his horse were present at the banquet. The sculpture was created by Pietro Tacca, pupil of Giambologna.⁷ In 1608, Giambologna created a copy of his bronze work "*Morgante on a Barrel*," in sugar paste for the wedding celebration of Cosimo II and Marie Maddalena of Austria.⁸

As sugar art developed into the 17th century, confectionery arts became less about apothecary medicine and evolved into a profession of its own. The confectioner with his knowledge of food science and art became an integral part of large banquet entertainment. English writer Giles Rose, published an English translation of a French textbook of etiquette. In the book, various household officers were described including the Master of the Household, the Master Carver, the Master Butler, the Master Cook, the Master Confectioner and the Master Pastryman.⁹ These were the positions which were responsible for providing food and service to the 17th century table. It is also the beginning of the consolidation of the

⁶ Krondl, Michael. *Sweet Invention: A History of Dessert*. Chicago, IL: Chicago Review, 2011. Print.

⁷ Lawrence, Cynthia Miller. *Women and Art in Early Modern Europe: Patrons, Collectors, and Connoisseurs*. University Park, PA: Pennsylvania State UP, 1997. Print. p128

⁸ Acidini, Cristina. *The Medici, Michelangelo, and the Art of Late Renaissance Florence*. New Haven: Yale UP, 2002. Print. p. 212

⁹ Rose, Giles. *A Perfect School of Instructions for the Officers of the Mouth Shewing the Whole Art of a Master of the Household [sic], a Master Carver, a Master Butler, a Master Confectioner, a Master Cook, a Pastryman ... : Adorned with Pictures Curiously Ingraven, Displaying the Whole Arts*. London: Printed for R. Bentley and M. Magnes ..., 1682. Print.

confectioner into the culinary staff. It is upon this foundation where Augustus Escoffier solidified the stations of the kitchen and the modern understanding of confection was born.

3 Tools of the Trade- Sugar Paste

Sugar paste was one of the most versatile of apothecary's tools. It could be easily molded, shaped and was a good vessel for delivering medication. In short, it was the medieval equivalent of modeling clay.

Medieval confectioners and apothecaries had the knowledge, skill and most importantly the materials needed to produce high quality sugar paste. The ability to create different formulas allowed confectioners create lozenges which could be used to sweeten the breath or ease sore throats and coughs as well as serving as a medium with which to create edible ornamentations.

3.1 White Sugar

Sugar paste, when broken down into its fundamental parts, is white sugar with a gum binding it together. Other ingredients may be added to a sugar paste formula based upon its function, but sugar and a gum binder are universal. Medieval and Renaissance recipes for sugar paste often refer to fine white sugar:

The making of sugar-paste, and casting thereof in carved moulds

*Take one pound of the whitest refined or double refined sugar, if you can gette it: put thereto three ounces (some comfit-makers put six ounces for more gaine) of the best starch you can buy; and if you dry the Sugar after it is powdered, it will the sooner paste thorough your Lawne Searce. Then searce it, and lay the same on a heap in the midst of a sheet of clean paper: in the middle of which masse put a pretty lump of the bigness of a walnut of gumme dragagant, first steeped in Rose-water one night;*¹⁰

For a large part of the Middle Ages, sugar was imported into Western Europe from areas such as Syria, Palestine, Morocco, Cyprus and Egypt and other parts of Africa. Sugar was a pricey commodity and was generally regarded as a spice. It was not typically found as a basic household good, and was instead reserved for medicine and use solely by those who could afford to pay for it. The trade in materials used

¹⁰ Platt, Hugh. "The Arte Of Preserving Conserving, Candyng." *Delights for Ladies: To Adorne Their Persons, Tables, Closets, and Distillatories with Beauties, Banquets, Perfumes, and Waters. Reade, Practise, and Censure*. London: Humfrey Lownes, 1609.

to create confectionery compounds (spices, gums, spiced wines, herbs and sugar) was controlled by spicer-apothecary members of the Worshipful Company of Grocers.¹¹ With the discovery of the “new world,” however, sugar cane became more readily available. Brazil, Sao Tome, Madeira and the Canary Islands were ideal locations for growing sugar cane.¹²

Sugar refining started in Europe in the 15th century. The price of sugar began to drop, allowing people to use it more freely as a culinary ingredient. Sugar cane would flow from the Mediterranean into Italy, where it was refined and shipped to other areas of Europe.

Refining sugar from cane into a usable product was not an easy task. The basic process contained three steps. Step 1: Boil shredded sugar cane to remove the sugar from the plant. Step 2: Clarify the sugar syrup by straining through lime water and egg whites or ox blood. Step 3: Mold the clarified and strained sugar concentrate into conical molds to cure and dry. This process resulted in a single refined sugar. This sugar was not often white, but a red or brownish color and it often contained a number of impurities including bits of cane particles and other debris.

Sugar of higher quality was refined a second time or even a third time. Triple refined sugar was the most costly and the whitest of the sugar grades. It was not uncommon for apothecaries to purchase a sugar of a low grade and complete the clarification process “in house”. Confectioners were trained in various methods of clarification and molding in order to get the best possible end product.

To purifie and refine Sugar

Make a strong Lixiuum of Calx vive, whereing dissolve as much course Sugar as the Livivium will beare, then put in the white of Egges (of 2 to every part of the Liquor) being beaten into an oil, stir them well together, and let them boyl a little, and there will arise a scum which must be taken off as long as any will arise, then poure all the Liquor through a great Wollen cloth bag, and so the feces will remain behinde in the bag, then boyl the Liquor again so long till some drops of it being put upon a cold plate will, when they be cold, be congealed as hard as salt. Then pour out the Liquor into pots, or moulds made for that purpose, having a hole in the narrower end thereof, which must be stopped for one night after, and after that night be

¹¹ "Origins & History The Worshipful Society of Apothecaries of London." *Homepage*. Society of Apothecaries. Web. 17 Jan. 2012. <<http://www.apothecaries.org/index.php?page=6>>.

¹² Mason, Laura. *Sugar-plums and Sherbet: The Prehistory of Sweets*. Totnes: Prospect, 2004. Print.

*opened, and there will a moist substance drop forth which is called Molosses, or Treakle, then with potters clay cover the ends of the pot, & as that clay sinketh down by reason of the sinking of the Sugar, fill them up with more clay, repeating the doing thereof till the Sugar shrink no more. Then take it out till it be hard, and dried, then bind it up in papers.*¹³

Proper clarification was required to achieve the white sugar used to produce edible ornamentation.

3.2 Gum Tragacanth

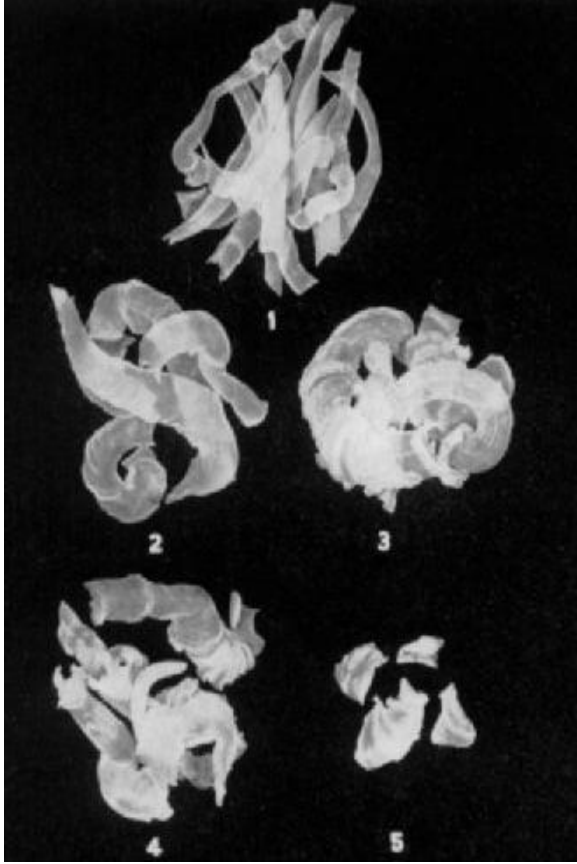
Sugar is only one half of a sugar paste formula. To form sugar paste, the sugar must be bound together by gum. While both gum tragacanth and gum arabic were two of the most common gum binders used in medieval confections, it was gum tragacanth that featured predominately in sugar paste formulas.

Gum tragacanth, also known as gumma dragantis and gum dragon, is a sticky extrude of a family of plants belonging to the genus *Astragalus*. This plant family grows in the Middle East. By the 1300s, gum tragacanth was an article of commerce in Europe. Just as with sugar imports, gum tragacanth's main entry point into the rest of Europe was via Italy.¹⁴

The type of plant from which the gum is harvested dictates the type and usage of tragacanth. The sweeter, whiter ribbon tragacanth or "maftuli," was employed in pharmaceutical mixtures and confections. The bitter, less clear flake tragacanth or "kharmony," was employed in textiles, leather working, paper making and gilding. The point in the harvest cycle when the gum is collected generally determines the grade.

¹³ French, John. *The Art of Distillation, Or, a Treatise of the Choicest Spagiricall Preparations Performed by Way of Distillation*. Lond., 1653. Print p126

¹⁴ Gentry, Howard. "Gum Tragacanth in Iran." *Economic Botany* 11.1 (1957): 40-63. JSTORE. Web.



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The terms ribbon and flake refer to the way the gum looks during the extrusion process. Gum production begins through a cut in the tap root. As the gum is harvested, the quality of the ribbon degrades.

Ribbons of gum tragacanth, representing various grades.

1, and 2 ribbons are of the best quality and most likely harvested within 10 days of cutting.

3 and 4 ribbons are of lower quality and are likely harvested 12 or more days after cutting.

5 ribbon has the lowest quality and borders on being classified as flake.

Gum tragacanth is a seasonal product. Much of the harvesting occurs in June and runs through the start of Autumn. It is viscous, odorless, tasteless and water-soluble. These are the qualities which make it an excellent binder.

Gum tragacanth is a very flexible gum. It can be combined with many different ingredients to create unique confectionery formulas. There are several different factors that will affect the overall end product. How long the gum is allowed to rehydrate will affect the elasticity and the quantity sugar would be required to be worked into the final paste.

Using more water to rehydrate the gum tragacanth will yield a product that is softer, easier to eat. This produced an end product one served to guests as part of the final course.

¹⁵ Gentry, Howard. "Gum Tragacanth in Iran." *Economic Botany* 11.1 (1957): 40-63. JSTOR. Web.

To make white Ginger bread

Take Gumma Dragantis half an ounce, and steep it in rosewater two daies, then put thereto a pound of sugar beaten and finely serced, and beat them well together, so that it may be wrought like paste, then role it thin into two Cakes, then take a few Jordain almonds and blanch them in colde water, then dry them with a faire Cloth, and stampe them in a mortar very finelye, adding thereto a little rosewater, beat finely also the whitest Sugar you can get and searce it. Then take Ginger, pare it and beat it very small and serce it, them put in sugar to the almonds and beat them together very well, then take it out and work it at your pleasure, then lay it even upon one of your cakes, and cover it with an other and when you put it in the molde, strewe fine ginger both above and beneath, if you have not great store of Sugar, then take Rice and beat it small and serce it, and put it into the Morter and beat them altogether.¹⁶

Using less water, adding an acid and egg white will produce a harder, crispier product. This type of paste would be used to create functional or sculptural items.

To make a paste of Suger, whereof a man may make al manner of fruits, and other fine thinges with their forme, as Plates, Dishes, Cuppes, and such like thinges, wherewith you may furnish a Table

Take Gumme and dragant as much as you wil, and steep it in Rosewater till it be mollified, and for foure ounces of suger take of it the bignes of a beane, the juyce of Lemons, a walnut shelful, and a little of the white of an eg. But you must first take the gumme, and beat it so much with a pestell in a brasen mortar, till it become like water, then put to it the juyce with the white of an egge, incorporating al these wel together, this don take four ounces of fine white suger well beaten to powder, and cast it into ye mortar by a little and little until they be turned into ye form of paste, then take it out of the said mortar, and bray it upon the powder of suger, as it were meale or flower, untill it be like soft paste, to the end you may turn it, and fashion it which way you wil. When you have brought your paste to this fourme spread it abroad upon great or smal leaves as you shall thinke it good, and so shal you form or make what things you wil, as is aforesaid, with such fine knackes as may serve a Table taking heede there stand no hotte thing nigh it.¹⁷

¹⁶ A, W. *A Book of Cookrye. Very Necessary for All Such as Delight Therin*. London: Printed by E. Allde, 1591. Print.

¹⁷ Dawson, Thomas. *Good Hus-wiues Iewell. Where Is to Be Found ... Wayes to Distill Many Wholsome and Sweet Waters ... In Which ... Is Shewed the Best Maner in Preseruing ... Fruits ... With Diuers Conceits in Cookerie with the Booke of Caruing*. At London: Printed by E. Allde for Edward White ..., 1597. Print.

A skilled confectioner knew when to use various formulas to achieve a specific result.

3.3 Armatures and Supports

Sugar paste was not a light weight material. To create large-sized sugar sculptures, artisans relied upon an underlying support structure, or armature, to prevent pieces from collapsing. The armature served a secondary purpose of allowing artists and confectioners to use less of the costly ingredients while still providing an air of extravagance.

Due to the nature of food based products, we are left to make educated guesses as to what may have been used as materials for armatures. The cook book “Le Viandier de Taillevent”, written in the late 14th century contained one of the first descriptions of an armature.

Entremetz plus legiers

Convendroit faire terrasses de pain bis et faire comme une damoiselle assise sur la terrasse, laquelle terrasse soit couverte de fueil d'estain vert et herboyé en semblance d'erbe vert; et y fault ung lyon qui ara ses ii pates de devant et la teste ou giron de la damoiselle; et luy peuit on faire une gueule d'arain et la langue d'arain tenve et les dens de papier collé a ladicte gueulle; et y metre du canfre et ung petit de coton, et quant on vouldra servir devant les seigneurs y bouter le feu. Et qui veult fair la semblance d'un loup, d'un ours, d'un asne royé, de serpent on quelque autre beste, tant privee que sauvage, se pevent fair semblables comme le lyon, chascun endroit soy.loup, d'un ours, d'un asne royé, de serpent on quelque autre beste, tant privee que sauvage, se pevent fair semblables comme le lyon, chascun endroit soy.¹⁸

Easier Entremets

You could make platforms of coarse bread, and represent a damsel sitting on the platform, which platform should be covered with tin leaf and painted to look green and grassy; and you need a lion that will have its two front paws on the lap of the damsel. And you can make it with a brass-lined mouth and a thin brass tongue, and with paper teeth glued in the mouth; and put camphor and a little cotton in the mouth and, when it is about to be served before the lords, set fire to this. If you wish to represent a wolf, a bear, a zebra, a serpent, or any other

¹⁸ Taillevent, and Terence Scully. *The Viandier of Taillevent: An Edition of All Extant Manuscripts*. [Ottawa]: University of Ottawa, 1988. Print.

*animal, whether domestic or wild, they can be done in the same way as the lion, each in it's own fashion.*¹⁹

Taillevent did not specifically mention how the outer layer of the lion was constructed. He did give detailed descriptions of what was needed to make the lion perform. Coarse bread, tin and brass were all part of the internal structures which supported the subtlety and allowed it to “breathe fire”.

Robert May described the use of paste board in building subtleties. This armature type was the base material for a ship, a castle and a stag. As May was a cook, he described covering it in pastry dough.

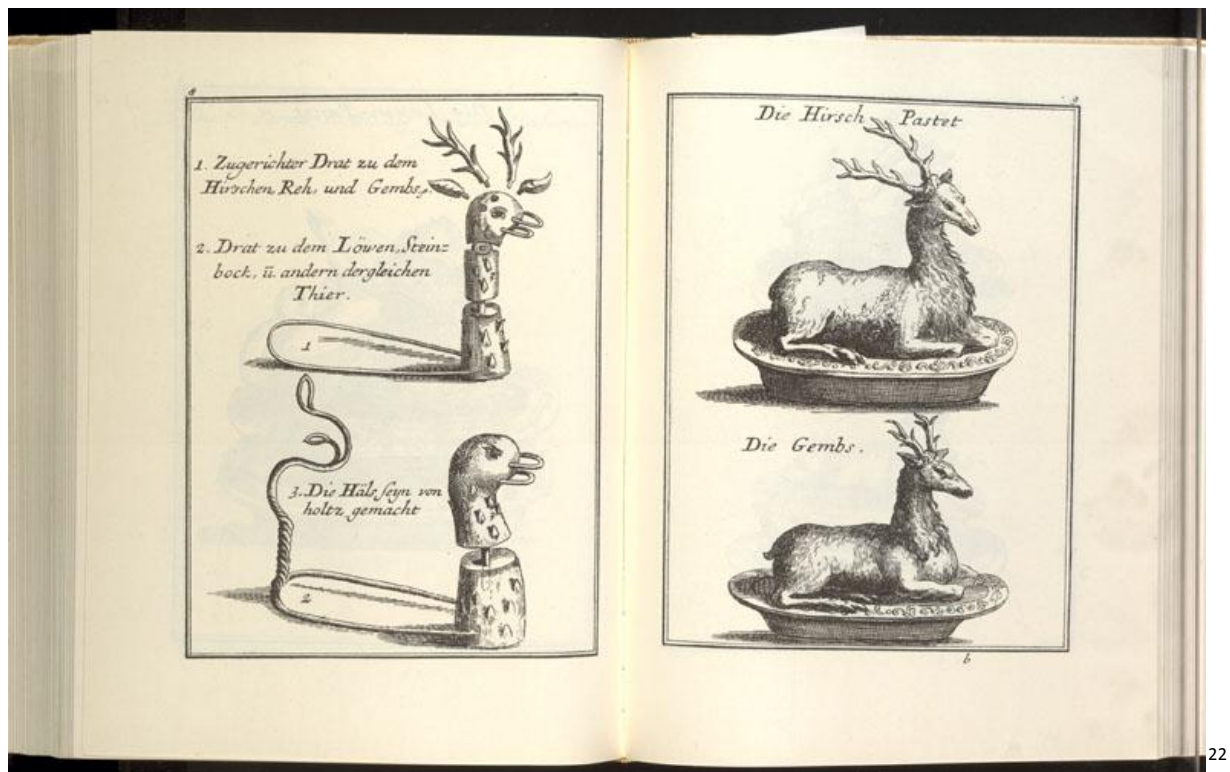
*Make the likeness of a Ship in Paste-board, with Flags and Streamers, the Guns belonging to it of Kickses, bind them about with packthread, and cover them with close paste proportionable to the fashion of a Cannon with Carriages, lay them in places convenient as you see them in Ships of war, with such holes and trains of powder that they may all take Fire; Place your Ship firm in the great Charger; then make a salt round about it, and stick therein egg-shells full of sweet water, you may by a great Pin take all the meat out of the egg by blowing, and then fill it up with the rose-water, then in another Charger have the proportion of a Stag made of course paste, with a broad Arrow in the side of him, and his body filled up with claret-wine; in another Charger at the end of the Stag have the proportion of a Castle with Battlements, Portcullices, Gates and Draw-Bridges made of Past-board, the Guns and Kickses, and covered with course paste as the former; place it at a distance from the ship to fire at each other.*²⁰

One of the most interesting examples of armatures comes from an early 18th century reference book. It depicts a wood and wire type of armature, which was able to be configured into a variety of animals. By adding different lengths of wood for the neck, additional wire for a tail, one form could be a sitting animal or swimming bird. It is noted that this was a conservative style of cookery - "incredibly old-fashioned".²¹

¹⁹ Scully, D. Eleanor, Terence Scully, and J. David. Scully. *Early French Cookery: Sources, History, Original Recipes and Modern Adaptions*. Ann Arbor, MI: University of Michigan, 2002. Print.

²⁰ May, Robert. "Triumphs and Trophies in Cookery, to Be Used at Festival Times, as Twelfth-day." *The Accomplisht Cook, Or, The Art and Mystery of Cookery: Wherein the Whole Art Is Revealed in a More Easie and Perfect Method Then Hath Been Publisht in Any Language ... Together with the Lively Illustrations of Such Necessary Figures as Are Referred to Practice*. London: 1660. Print.

²¹ Coutts, Howard, and Ivan Day. "Sugar Sculpture, Porcelain and Table Layout 1530-1830." *The Henry Moore Foundatio*. 7 Jan. 2009. Web. 24 Jan. 2012.



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For building sculptural sugar subtleties, a confectioner wants a pliable paste that will dry hard. Egg white and acid (usually lemon) give sugar paste additional structure and binding capabilities. These stiffer pastes were also good for putting into wooden or plaster molds. Care needs to be taken when working with this paste. Once it has dried, it is subject to cracking.

And if, in the making of this paste you happen to put in too much gum, you may put in more sugar thereto, and if too much sugar, then more gum; you must also work this paste into your moulds as speedily as you can, after it is once made, and before it harden: and if it growe so hard that it cracks, mixe more gum therewith: cut away with your knife from the edges of your paste, all those pieces which have no part of the worke upon them, and worke them up with the paste which remaineth; and if you will make sawcers, dishes, bowles, &c. then (having first driven your paste up on paper, first disted over with sugar to a convenient largenesse and thickness) put the paste into some sawcer, dihs, or bowle of a good fashion, and with your finger presse it gently down, to the insides thereof, till it resemble the shape of the dish, then

²² Hagger, Conrad, and Manfred Lemmer. *Neues Saltzburgisches Koch-Buch: Für Hochfürstliche U. Andere Vornehme Höfe, Klöster, Herren-Häuser, Hof- U. Hauß-Meister, Köch Und Einkäuffer ...* München: Heimeran, 1977. Print. Image location: http://www.library.upenn.edu/exhibits/rbm/chef/images/fulldisplay/4_6_A.jpg

*paire away the edges iwth a knife, even with the skirt of your dish, or sawcer, and set it agsint the first, till it be dry on the inside: then with a knife get it out, as they use to doe a dish of butter, and dry the backside: then gild it on the edge with the white of egg laid round about the brim of the dish with a pensill, and presse the gold downe with some cotton; and when it is dry, skew or brush off the gold with the foot of a Hare or Cony. And if you would have your paste exceeding smooth, as to make cards and such like conceits thereof, then toule your paste upon a sliced paper with a smooth and polished rowling pin.*²³

Once a sculpture is created, a number of different options are available to the artist. Since the surface dries to a bone dry consistency, details can be worked using common hand tools including rasps and scrapers. It is an ideal surface to paint and gild. In the Middle Ages and Renaissance, pigments made from cochineal, carmine, spinach, beet, buckthorn, saffron and burnt ivory were mixed with gum arabic and painted directly to the dried paste. Gilt was applied using egg whites or gum arabic.

Due to decomposition of natural food based materials, there are no extant sugar pieces available for viewing. Sugar sculptures currently on museum display are modern replicas using 18th century molds. This lack of data leaves scholars the daunting task of trying to recreate techniques and formulas based upon written accounts and educated guesses.

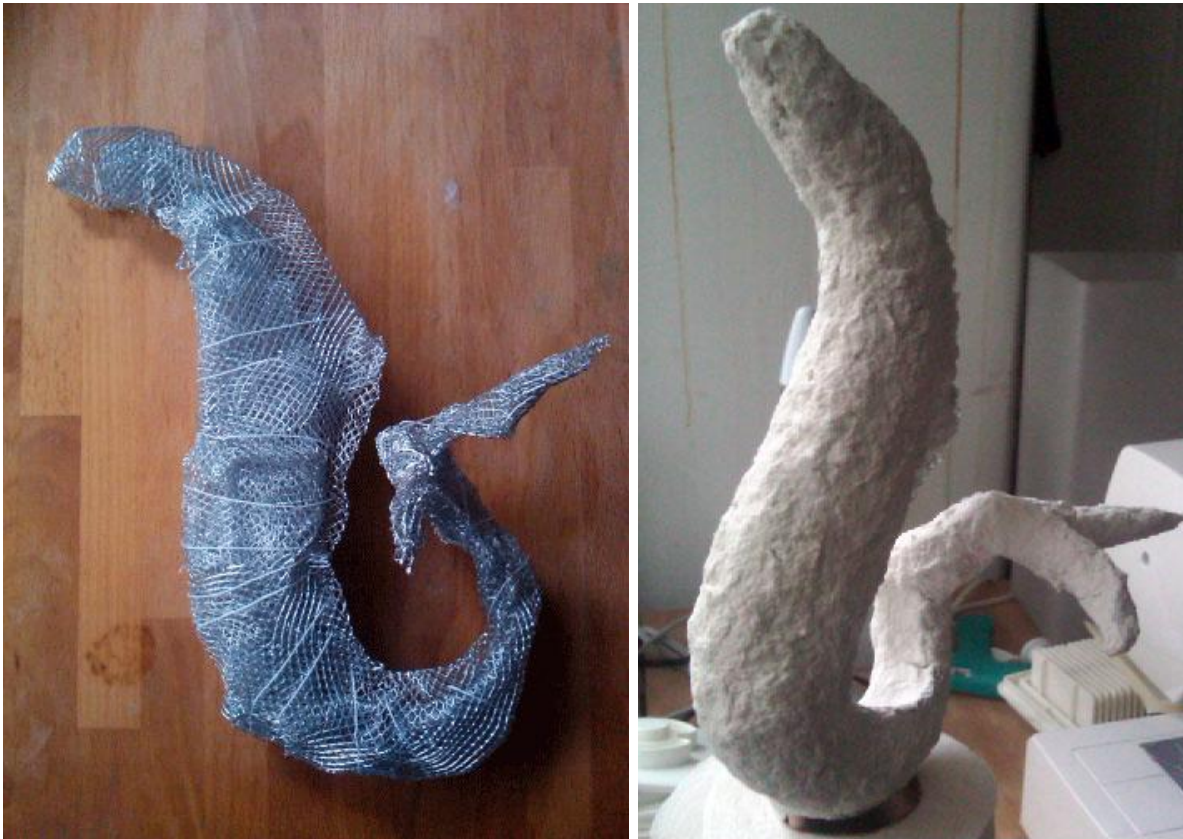
4 Recreating Renaissance Sugar Sculptures

When building a structure it is important to know the limitations of various materials, and work to compensate for them. Sugar is a temperamental material, prone to many problems. When added to an armature structure, these problems can be compounded.

- Sugar is very porous and extremely hygroscopic. In certain areas of the world, it should be sealed against humidity in order to prevent cracking and rehydration.
- Metal can add significant weight to the overall piece. Depending on the material used, it can rust and is difficult to seal.
- Paper, wood, and other plant based materials (pasteboard) are hygroscopic. This can cause an armature to warp and rot if kept in moist conditions for too long. It is also highly flammable if working with a subtlety which will be employing fire.

²³ Platt, Hugh. "The Arte Of Preserving Conseruing, Candyng." *Delights for Ladies: To Adorne Their Persons, Tables, Closets, and Distillatories with Beauties, Banquets, Perfumes, and Waters. Reade, Practise, and Censure.* London: Humfrey Lownes, 1609.

Craft grade aluminum mesh is a good armature material. It is rust resistant, very pliable and can be formed easily without the need for specialized tools. The mesh is “porous” and sugar does not adhere well. Sugar has to be pushed deeper into the structure and this adds significant weight to armature. A shape can be formed and bound with silk beading floss. These starting layers are less about features and more about creating the outline of the overall structure.



Paper maché/pasteboard is the second layer and creates a good barrier between metal and sugar. The paper mache’s rough texture is ideal for grabbing sugar paste. The clean white paper pulp does not have a binder and is “activated” with water. It is starch free, which means that it is safe for people with starch/gluten allergies. It is white, which reduces potential ink bleed through to the sugar.

Plaster of Paris might be a better choice for a more medieval armature. However, the combination of metal mesh and paper maché does not have the heat or toxicity of plaster of Paris. Plaster of Paris when mixed with water causes an exothermic reaction and can cause severe burns. Chemicals in plaster are

considered to be irritants to the skin, lungs, eyes and stomach (if ingested).²⁴ These hazards make Plaster of Paris effectively useless for a re-creationist.

This layer must be sized or the paper will leech the liquid out of the sugar too fast. It can also pull moisture from the environment, which will cause the sugar to crack and the armature to warp. Both of these things would be catastrophic to the overall piece. The armature is sealed with glair. Between the wire mesh and the paper maché, the structure is very light, structurally sound and non-toxic. This is also the time to build supporting armatures, if the piece requires one.



The sugar paste recipe (appendix 1, sugar paste- sculpting formula) has been formulated to work better for sculpture. It has a shorter “seep” time and a greater percentage of gum tragacanth than formulas which would be used for edible confections. This creates a paste that dries very hard, quickly. This harder paste is more easily sanded and shaped with rasps, sandpaper and files. The shorter dry time, allows for faster production.

The paste is applied in thin layers. First a layer of white is to the armature providing a base for the colored sugar paste to be applied. Second, colored paste is added to create a base of color and to form the overall texture of the piece.

²⁴ "MSDS :: Calcium Sulfate (Plaster of Paris)." *Educational Science Supplies, Toys, Games and Kits*. Science Stuff, Inc., 1 Sept. 2006. Web. 26 Jan. 2012.



Finally pastry paint is applied directly to the subtlety. After application to the armature, the sugar needs to be sealed as well. The most ideal material for sealing the sugar is wax or shellac. Water is the bane of existence for sugar work. Drying too fast will cause the piece to crack. Too much humidity and a piece that was rock hard will rehydrate and slump. Both wax and shellac are able to get into the porous surface and protect the piece against humidity.



Tools use to create and shape sugar sculptures are identical to those found in ceramics.



5 Conclusion

In our modern age of pastry and confections, the sugar art is still considered a specialized discipline. However many of the formulas for sugar paste remain the same as they did in the 15th and 16th centuries. Methods of construction and the usage of armatures is still widely practiced in the pastry world. Pastillage, gum paste and fondant are among the modern terms for “sugar paste,” a basic tool for apothecaries since the Middle Ages. Modern sugar paste and fondant formulas still rely on the same basic building blocks: an amalgamation of sugar, a gum binder, water and acid.

6 Acknowledgements

I would like to thank Johnna Holloway (THL Johnnae llyn Lewis, CE) bibliographer and co-moderator of the SCA Subtleties list and Dame Alys Katharine, OL, OP for their assistance with accessing historical materials and accountings. I would also like to thank Mistress Alys Mackyntoich, Mistress Juliana von Altenfeld, THL Femke de Roas, Lady Elysabeth Underhill, Lady Jane Milford and Lady Amy Webbe for assistance with proofreading and edits.

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8 Appendix

8.1 Modern Recipes

Sugar paste- sculpting formula

1 tbl tragacanth gum

1 tbl corn syrup (optional, dependent upon humidity level)

3 tbl warm water

1 tbl rose water

1 tbl lemon juice

1 pound powdered sugar

1. Mix warm water, rose water and corn syrup until dissolved.
2. Add the gum and lemon juice and, after these ingredients are thoroughly mixed, add small amounts of powdered sugar until you can work the mixture with your hands.
3. Continue adding small amounts of powdered sugar while kneading the mixture on a table top. As soon as the mixture is pliable and can be shaped without sticking to your fingers, you've added enough sugar (a pound or more)

Glair- used as sizing²⁵

1. Whip egg whites until stiff peaks form
2. Refrigerate covered overnight
3. Drain liquid that has separated out from egg froth
4. Discard egg froth, liquid is the glair.
5. Store refrigerated.

Beeswax- used as sealant

Heat clean, filtered beeswax until just melted.

Can be painted/rubbed directly on to sugar

Paper maché²⁶

1. Tear clean paper into bits and add to water
2. Cook paper and water until paper turns into a thick mush
3. Strain to remove excess water
4. Beat paper mush with a metal whisk until all the paper has become pulped
5. Knead starch paste into paper mush, until mixture resembles a claylike paste

Starch paste²⁷

3 tablespoons of flour

1/3 cup of cold water

Mix ingredients to a smooth consistency

²⁵ Massey, Robert. *Formulas for Painters*. New York: Watson-Guption Publications, 1967. Print.

²⁶ Roth, Charlene Davis. *Making Original Dolls of Composition, Bisque, and Porcelain*. New York: Crown, 1980. Print.

²⁷ Roth, Charlene Davis. *Making Original Dolls of Composition, Bisque, and Porcelain*. New York: Crown, 1980. Print.

8.2 Glossary

Armature: An underlying, unseen, supporting component usually of wood, plaster, wax or metal. This structure would be covered by sugar paste.

Banqueting stuffes: The final course of a banquet, usually dedicated to sugar work and confections.

Binder: A substance used to “stick” two unlikely ingredients or materials together, usually a starch, gum or egg.

Calx vive: Lime water

Fondant: A modern, moldable sugar paste made with water and white sugar, bound together by gelatin.

Glair: A glaze or size made of egg white.

Lixivium: Lye

Paper maché: French for 'chewed paper', it is a composite material consisting of paper pieces or pulp, often reinforced with textiles and bound with a starch. Paper pulp was a by-product of the book binding industry. Modern paper pulp can be purchased at any craft store or online.

Paste board: A type of thin board made by pasting together sheets of paper. Pasteboard was a by-product of the book binding industry. The modern equivalent of pasteboard might be a heavy weight card stock or thin, non corrugated cardboard.

Pastry powder: This is a modern powdered, non-toxic paint color used for decorating pastry. These colors can be used dry and dabbed on with a dry brush or activated using alcohol to create a brushable paint. Pearl paint or luster dust is a type of dry paint that has a luminescence to it.

Refined sugar: Sugar that has been extracted from a plant material such as sugar cane or sugar beets. The higher grade of the sugar, the greater yield of clean, purified, usable sugar was available to the end user.

Sizing- Any substance used to coat or fill the fibers of a support. It protects an under lying layer from other layers that may cause damage or deterioration.

Sugar paste:A moldable paste made with water and white sugar, bound together by tragacanth gum. Sugar paste can be formulated for a variety purposes, including sculptural and edible. Formulas for sugar paste have not evolved much from the first formulas in the 15th century.

Tragacanth gum: A viscous, odorless, tasteless and water-soluble sap which is drained from the root of the plant and dried. These qualities make it an excellent binder. In period recipes, these qualities would be used to bind the rosewater and egg whites with the sugar. This gives sugar paste its elastic qualities. Modernly, powdered tragacanth gum can be purchased from specialty and online pastry vendors.