

The Rietz Collection of Food Technology

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The Rietz Collection of Food Technology is housed in the Department of Anthropology at the California Academy of Sciences and was amassed by Carl Austin Rietz during the mid 20th century to document the cultural development of technologies associated with preparing and eating food among numerous cultures and time periods. Rietz, a pioneer of industrial food processing, collected the objects during his world travels that spanned several decades and intended the Collection as a tool for cross cultural comparison and education. The Collection contains 1328 objects originating in ancient Palestine, Cyprus and Greece, Medieval Persia, Renaissance Europe, Colonial North America, 19th century Japan and China, as well as early 20th century Africa and Oceania used for the serving, preparing, and storing of foods. Composed of diverse materials such as stone, clay, bone, ivory, leather, wood, plant fibers, glass, and various metals and metal alloys, the objects in the collection illustrate the variety of tools developed and used for eating and cooking worldwide. Areas of representation include the development of cutlery and chopsticks, serving and tableware, household and professional cookware, domestic hearth tools, and storage containers. The Collection lacks detailed provenance for most objects, but a basic understanding of Rietz's life and collecting practices helps to uncover information about the origin and identity of individual objects and groupings thereof. The materials in the Collection provide an important resource for scholars investigating material practices related broadly to food within the fields of anthropology, history, or culinary arts.

The Rietz Collection of Food Technology (henceforth referred to as the Collection) is one of the few and perhaps, only, cross-cultural collections of culinary objects assembled to document historic technologies of cooking and eating. It consists of 1328 objects and tools used for the collection, preparation, serving, and storage of food. The objects represent the technologies of eating and cooking of numerous cultures, time periods, and environments. Examples range from 10th to 6th century BCE Mediterranean household terra cotta cookware to 19th century English and French professional culinary pots and pans and 20th century Africa and Oceania. The highlights of the Collection include almost every example of the development of the knife and fork in Europe from the Renaissance to the early 19th century, colorfully glazed serving ware from Medieval Persia, 18th and 19th century French and English measuring cups used for trade, as well 18th century domestic, hearth tools from North America and Europe.

The California Academy of Sciences received the Collection from the family of the late Carl Austin Rietz in 1974. An early pioneer and inventor of industrial food processing, Rietz had traveled widely to install and promote his machinery used for large-scale food processing. In the course

of his travels, he collected historic objects related to the various aspects of food processing. Rietz created his Collection to illustrate cultural comparisons. He saw the act of preparing and sharing food as a universal practice among cultures and, thus, as an avenue for exploring cultural diversity. His goal, to share knowledge of other cultures with those from his own culture in hopes of illustrating the commonality of all cultures, was thus educational, as he attempted, through the lens of cooking and eating, to promote peace and cultural understanding through shared knowledge of cultural practices.

THE COLLECTION

Currently housed in the Department of Anthropology at the California Academy of Sciences, the Collection consists of objects related to food technologies and an image collection of culinary themed illustrations, engravings and prints, as well as a collection of 7500 color film transparencies depicting industrial food processes and technologies of the 1950s and 1960s.

The objects in the Collection are, by definition, utilitarian and represent over three millennia of cooking and eating. With many cultures and time periods represented, classification of the objects could be a monumental project. However, most can be classified in a manner consistent with an anthropology or natural sciences collection, according to the region and cultural area from which they originated. The groupings employed by the collections staff of the Department of Anthropology at the California Academy of Sciences are the following: East Asia, Southeast Asia, Southwest Asia, South-Central Asia, North Africa, Sub-Saharan Africa, North America, South America, Mexico and Central America, Australia, Oceania, and Europe.

Access to the Collection is available through the Internet on the California Academy of Sciences website: <<http://www.calacademy.org/research/anthropology/collection/collintro.htm>>. The Collection database provides current physical descriptions, locations, and digital images of most objects in the Anthropology Collection.

Over 800 objects from the Collection have been exhibited either at the California Academy of Sciences or by other institutions. Institutions in the San Francisco Area that have borrowed objects for display include the Fine Arts Museums of San Francisco, the California College of Arts, San Francisco Airport Commission Bureau of Exhibitions, Natural History Museums, and Cultural Exchange, The San Francisco Yacht Club, San Francisco State University, and the University of California San Francisco. Other institutions in California and the United States that have displayed objects from the Collection include the American Museum of Natural History in New York, the City of Palo Alto, California, the Jesse Peters Memorial Museum at Santa Rosa Junior College, and the de Saisset Art Gallery and Museum at the University of Santa Clara.

In addition to exhibits of objects, the Collection has been an integral part of the Rietz Food Symposium presented by The California Academy of Sciences and The Rietz Food Technology Foundation. Rietz Symposia were held from the mid-1980's through the 1990s at the California Academy of Sciences with a general theme related to historical and contemporary food traditions:

1983	Bay Area Culinary Traditions.
1986	Chinese Culinary Traditions in the Bay area.
1988	Chiles to Chocolate: Foods The Americas Gave the World.
1990	Bounty By The Bay: A Region's Culinary Heritage.
1992	Celebrating Spring: Foods and Festivals of the Season of Renewal.
1994	Foods for The Future: Anticipating Tomorrow's Table.
1996	Bread: Staff of Life.
1998	Food: Health and Healing.

DOCUMENTATION OF THE COLLECTION

Rietz left little information regarding his thoughts, intentions, or goals for the food-related objects he had collected. As his collections grew, Rietz did not articulate a general plan or mission regarding the scope of materials he hoped to collect. It is not clear if Rietz kept a collection journal or collection notes, as none have been found among his papers. However, in a letter dated March 6, 1956, found with invoices from a trip to Europe in 1955–56, Rietz mentions the following:

Within the next month or so I hope to get down to the project of making a set of sketches and some notes of my interests in a number of different things; the arts and artifacts of antiquity, particularly the knives and spoons and bowls of metal, bronze and iron, from the earliest historical period up to the Medieval and early Renaissance. (Rietz Archive, Box 3)

His intent was obviously to document some of his ideas about what and why he was collecting, but unfortunately he seems not to have had the opportunity.

A corresponding difficulty with the Collection is the overall lack of provenance for the individual objects. Rietz left little information about where and how he gathered the objects he found all over the world as well as basic information about each object. Without verifiable provenance, information on its date of manufacture, use, or material composition, the use of the collection for scholarship and study is problematic.

The only surviving paper work from Rietz consists of the collection files that accompanied the Collection when it was first received at the California Academy of Sciences. The Rietz archive located in the library of the California Academy of Sciences provides a modest paper trail of his collection travels and practices. Receipts and invoices from antique dealers, galleries, curio shops, and museums provide evidence of his purchases. Customs papers, tax duty receipts, and income tax statements give descriptions of objects and their origins as well as their estimated value. Equally valuable in the archive are itineraries of his travels and some correspondence related to purchases, vaguely outlining how he built his various collections over thirty years.

Research in the papers of the Rietz Archive and corresponding collection inventories that accompanied the Collection have provided information about his collection practices and his intentions for the use of the Collection. Interviews with his daughter, Betsy Rietz Dingwell, have also proved to be helpful in uncovering the intentions and collection practices of Rietz and to some degree, his motivations. These documents and interviews attest to not only the variety of his collecting tastes, but also to his desire to share his finds. The Archive also describes, through some limited correspondence and money transfers, his support of universities and museums through donations of his collections or financial support of foundations dedicated to education.

A SHORT BIOGRAPHY OF CARL AUSTIN RIETZ

Carl Austin Rietz was born on August 3, 1894 in New York City. He spent his childhood and adolescence in the San Francisco area, later attending Columbia University, Harvard and the Massachusetts Institute of Technology, as well as the University of Maryland and Johns Hopkins University, where he studied medicine. It is unclear as to which degrees or fields of study were completed by Rietz during his years of academic training, but eventually he earned an engineering degree from the University of California at Berkeley. Rietz served in World War I as an ambulance driver and later worked as a private secretary for the famous mining engineer John H. Hammond, as cameraman for D.W. Griffith in Los Angeles, and as secretary to Thomas A. Edison. A Rietz family anecdote tells of how the young Rietz, by scoring one of the highest marks on the famous inventor's first comprehensive IQ tests, secured his position with Edison.

Medical school in Maryland piqued Rietz's interest in diet, nutrition and food processing. In 1931, as a result of his training in engineering, medicine and draftsmanship, he designed the first Rietz Disintegrator — a device for pulverizing the desirable parts of raw foods, ejecting inedible parts such as bone, seeds and stems. His "vertical" machine was easy to sterilize and was such an improvement over existing disintegrators that it became the standard for the food, chemical and paper processing industries. His innovations, although considered radical in the 1930s and 1940s, would soon become foundational to modern, industrial processing not only in the United States but also world-wide.

International interest in the Rietz Disintegrator continued to grow after World War II, prompting extended travel throughout the world for the remainder of his life. Rietz was called upon by the Economic Co-operation Administration, a post war economic program of the United States Government, to survey the needs of European nations regarding food processing machinery and infrastructure. This effort was instrumental in the integration of modern mechanization practices into European agricultural processing. Rietz also worked with the Ralph M. Parsons Group as a consultant in establishing mechanization of modern fishing and fishing industries in the Red Sea area of the Middle East. During his travels of this period, Rietz's storehouse of information about the different cultural attitudes and practices around food and eating was gained first hand through the meals he shared with local peoples. He disdained eating in places with normal tourist fare and sought out the authentic cuisine particular to a specific locale and culture.

Rietz did not restrict his exploration of world cuisines to contemporary meals of the countries he visited. His understanding of food processing technologies coupled with his interest in international cuisine and history led him to explore the history of how people of different cultures have tackled the basic requirement of feeding themselves. He had a personal philosophy, often repeated by those who knew him, that the formula for world peace was the honest understanding of other cultures. He viewed food and cuisine as an obvious tool for such cultural understanding. As he traveled, he began to search out the historic artifacts that told the story of cooking and eating in each place he visited. His interest was broad and he chose objects primarily as examples of technology rather than for their craftsmanship. His primary interest was in how an object was used rather than how it was made.

Rietz's responsibilities in the reconstruction of post -WW II Palestine in the late 1940s led to his acquiring a varied collection of ancient Palestinian artifacts related to all aspects of food technology. This first collection of food utensils was the beginning of his focus on the collecting of historical food technology and remains a significant part of the present Collection. It consists of metal utensils and clay vessels and dates from a period spanning the second century B.C.E. to the second century C.E. The foods and dining practices described in biblical texts became one of his research interests and he would later use this collection of artifacts for demonstrations and lectures on the subject of New Testament era cuisine and ritual. The wedding of his daughter Sandra garnered media attention in 1955 due to his unconventional use of ancient artifacts in the ceremony. Rietz incorporated elements of biblical marriage rites complete with period wine cups and oil lamps. The wedding cake was the size and shape of a beehive, served with other foods Rietz had researched for their connection to ancient ways of celebrating the marriage union.

Documentation for the Collection is best for 1950-era objects, when it appears that Rietz's business interests, travel and collecting began to be fully integrated. The bulk of invoices, receipts and customs papers in the Rietz archive date from this period. It is at this time that Rietz acquired the majority of his collection of artifacts related to food technology and developed relationships with specialists in several disciplines at Mills College in Oakland, California. In 1951, President White of Mills College appointed Rietz to a lectureship in International Cuisine and Food

Technology. He traveled extensively during the following year to Africa and the Middle East, as well as to Austria, Sweden, England, and Scotland. In 1953, the first home for his extensive collection of food related artifacts was established as The Rietz Food Technology Foundation at Mills College with what was described as an “object collection in illustration of the progress of science.” The next few years saw Rietz engage in extensive global travel and collecting in ceramics, textiles, food artifacts, folk art, and books. In 1955, Rietz appeared on KRON television in San Francisco in a program featuring the Food Technology Collection. At about the same time, he hosted a series of thirteen, one-hour radio broadcasts on San Francisco’s KQED titled, “Food, Fire, and Folklore.”

In the early 1960s, although occupied with the expansion and relocation of Rietz Manufacturing from San Francisco to Santa Rosa, California and extensive travel, Rietz managed to author a treatise outlining a scientific approach to selecting, preparing, and cooking food. *A Guide to the Selection, Combination, and Cooking of Foods: Vols. I and II*, published in 1961, was co-authored with Jeremiah J. Wanderstock. The foreword, by Donald K. Tessler, describes the purpose of Rietz’s project; “This is not a cookbook, but rather a detailed discussion of food preparation and cooking, with the intent of placing routine procedures on a truly scientific basis.” (Rietz, 1961). The book’s discussions pursued a rational structure for the measurement of taste. Through the presentation of the “Gustametric Master Chart,” which was described as “a common logarithmic scaling system,” the authors assigned a specific value to all foods in order to “determine quickly and exactly which combinations of foods make for agreeable meals.” Although their attempts to measure taste were well intentioned, the many aspects of eating and cooking proved subjective and difficult to quantify.

Rietz was in the process of researching and writing an additional book about the science of taste at the time of his unexpected death on September 19, 1965. He died in his sleep at his San Francisco home, the victim of an apparent heart attack. Due to his untimely death, Rietz’s intention to document his various collections and record his thoughts on food technology remained unfulfilled.

COLLECTION PRACTICES

Information on Rietz’s collection practices is helpful in understanding how the Collection was assembled. The following is a short description of some of the acquisition practices that Rietz employed as a collector that is gleaned from the papers of his personal archive.

Rietz’s extensive travel history was chiefly a product of the growth and expansion of Rietz Manufacturing. Rietz’s choice of objects from specific cultures and locations was a result of where he happened to be traveling. Cultural representation within the Collection was not a product of deliberate collecting as much as it was a secondary aspect of his travels.

Rietz enlisted the assistance of antique dealers, traders, and other field experts in various parts of the world to act as his agent for locating and purchasing objects of interest. Thus, his primary source for objects was through the established antiquities trade of the places he visited. Rietz collected on several fronts simultaneously: Asian ceramics and snuff bottles, textiles, jade, kitchen antiques, artifacts of food technology, Egyptian, Roman and Greek antiquities, knives and cutlery, cookbooks, culinary illustrations, prints, and engravings. A common strategy of Rietz was to purchase whole lots of objects even though he may have been interested in only one or two objects within the group purchased. Rietz formed close relationships with curators and other museum and object professionals for guidance and legitimacy. He created several foundations to house and exhibit his various collections. At Mills College in Oakland, California he established the Mills College Asian Ceramics Collection in 1951, The Rietz Folk Art Center in 1952, as well as The Rietz Technology Foundation and The Food Artifacts of Man in 1958. He also donated a significant col-

lection of objects related to the history of medicine to the University of California at San Francisco.

From information gathered about Rietz's life and collection practices, it seems that his primary concern for collecting was education. He wanted to share knowledge of other cultures in the hope of illustrating the commonality of all cultures, his goal being to promote peace and cultural understanding through knowledge of others. He understood his collection of artifacts of food technology to be one of cultural comparison rather than cultural representation. He was not attempting to collect in order to illustrate the development of technologies related to food of one specific group through time. He collected what he happened upon or was offered, adding to a collection that he hoped would illustrate the universal attempt of humanity to appease hunger and thirst across all cultures and time periods.

THE TECHNOLOGIES OF FOOD

The Collection comprises objects concerned with the technology involved in the human interaction with food. The term "food technology" is broad and encompasses the processes and practices beginning with raw resources or ingredients, through intermediate stages of food preparation, to the final prepared food ready for consumption. The manipulation of food involves several stages, moving through a continuum of processes that are ongoing and simultaneous. These processes can be defined as the following:

1. The ingredients must be procured. This might be done through hunting, gathering, fishing or agricultural production;
2. The resulting resources often require preliminary processing. Initially, raw resources are modified in some way, i.e., grain is harvested and milled to flour; meat is butchered into manageable cuts;
3. These resources are distributed in some fashion and, perhaps, stored.
4. The preparation phase renders the raw foodstuffs into final products by any of a variety of methods such as cooking, fermenting, brewing, or distilling;
5. The food ready for eating is then consumed. This act may be simple or complex depending on the culture and occasion; and
6. The leftover foods and raw materials must be discarded or stored.

Each process involves specialized tools as well as specific techniques developed within the context of a particular environment and culture. These practices are often highly ritualized and invoke ceremony of some kind.

The processes described within the study of food technologies can be further distilled to involve the same basic operations for most cuisines:

1. Storing and transporting, which require containers of various shapes, sizes, and materials;
2. Preparation and cooking, which involve tools for techniques such as heating, chilling, cutting, mixing, separation, retrieving and turning, measuring, forming, brewing or fermenting;
3. Serving, which involves specialized objects and tools depending on cultural practices;
4. Eating and drinking, which may involve specialized tools as well as a multitude of cultural behaviors and rules.

The tools and material utilized in these basic operations are the basic artifacts of food technology.

HIGHLIGHTS OF THE COLLECTION

The Collection is not a comprehensive collection of food technology, but objects in the

Collection illustrate most of the fundamental developments of the processes and practices associated with the human manipulation of food through time and across varied cultures. Common practices such as use of fire, cutting, serving and storing of foods are illustrated through objects from the first millennium BCE to the early 20th century. Objects made of clay, wood, bone, leather, metal, and glass originating from Ancient Palestine, Cyprus and Asia Minor, Arab-influenced Persia, Medieval and Renaissance Europe, Colonial North America, 19th century Japan and China, and Edwardian England and France illustrate the cultural development of technologies associated with preparing and eating food.

Mediterranean Terra Cotta and Bronze-ware

The oldest materials in the Collection are common unglazed terra cotta vessels from Ancient Palestine and decorated serving-ware from Cyprus (Fig.1). Dating from roughly the 10th to the 6th century BCE, the bowls, pots, and jars represent the forms of vessels used for storage, preparation, and serving of food and drink that would have been common during the Iron Age. These items were the most basic of tools of ancient cooking used at every meal and were often items of trade. Produced by Phoenician colonies on the coast and islands of the eastern Mediterranean, these objects were exported to the Levant and Egypt. Such common and ubiquitous trade goods underscored the shared cooking and eating technologies of differing cultures throughout the region. Their basic structure and function remained unchanged for millennia.

The Collection also contains bronze cooking vessels from Roman Palestine that date from the 1st century BCE to the 2nd century CE. Although badly corroded, they illustrate the shapes of cast metal cooking vessels of the period. Due to their cost, metal-cooking vessels would not have been used by common workers. These vessels represent the cooking technologies of a more affluent class of household.

Other objects in the Collection from the eastern Mediterranean are 5th century BCE Greek drinking vessels (Fig. 2). The cups and pitchers are highly polished with a rich black slip glaze. Used by the upper classes of Greek society throughout the Greek colonies of the eastern Mediterranean, these simple but stylized objects allude to the highly ritualized practice of drinking wine.

Persian Ceramics

Clay and ceramic materials from Persia, now modern Iran, comprise one of the largest groups of objects collected by Rietz. Numbering over a hundred objects, the rich tradition of Persian pottery is demonstrated in this collection with examples dating from the first century BCE to the late 19th century CE (Fig. 3). The bulk of the Collection dates from the Medieval Islamic period of the 11th–14th century CE. Objects from the major ceramic producing areas of Persia during this period, Kashan, Nihavand, Zenjan, and Rayy, are represented. Most of the objects are serving pieces with beautifully multi-hued decorative glazes and designs. Used by nobility and merchant classes, the size and shape of the platters, dishes, and bowls suggest communal sharing of food and drink and attention focused on matters of the table and eating.

Eating Utensils: Knife Collection

Numbering over 350 individual examples from Europe, Asia, Africa, and the Americas, and ranging from the early 16th century CE to the 20th century CE, this collection illustrates the variety, history and development of the knife in the Modern period. Knives are arguably one of the most important tools of the kitchen and the dining room. Together with containers and fire, knives remain

as necessary to a modern meal as they would have been centuries ago. Since most aspects of food preparation require their use, the story of the development of the knife is fundamental to Rietz, who understood its importance and primacy to the technology of eating and cooking. There is an obvious focus on their collection and an attention to the variety of uses to which they can be put. He collected kitchen knives, utility knives, carving knives, chopping knives, cleavers, cheese knives, fruit knives, scissors, folding knives, traveling knives, bread knives, and daggers. (Figs. 4 and 5) In the pursuit of cross cultural examples, he collected knives from Northern Europe (specifically England, Germany and the Netherlands) as well as Italy, France, Spain, Japan, China, Nepal, Ceylon, Afghanistan, Burma, India, Indonesia, Oceania, Africa, and the Americas.

Included with the knife collection are also examples of the historic development of the fork in the West and chopsticks from Asia (Figs. 6 and 7). Grouped as a chronicle of the development of eating utensils that carry food to a diner's mouth, the Collection is one of only a handful of collections of cutlery that clearly illustrates the evolution of tableware. Equally significant are the multiple examples of cutlery from major foundries and metal smiths, primarily of England and Germany, which are representative of the manufacturing processes of metal household goods during the entire Industrial Revolution.

The knife and cutlery collection is probably the best understood and documented area of the Collection. Examples of knives, forks and chopsticks have been exhibited frequently at the California Academy of Sciences and loaned to other institutions. The provenance for these objects is well documented and has been greatly enhanced through a collection survey conducted in 1982 by Bernard Levine.

German and Dutch Ceramics of 18th Century North America

The German and Dutch colonists who settled the rural areas of Pennsylvania and New York in the early 17th century were heirs to not only the cooking and eating traditions of their northern European homelands but also the cooking technologies as well. The Collection holds about fifty pieces of household ceramic containers used in preparing and storing food that reflect the traditions of the German and Dutch foodways in North America (Fig. 8). Produced mainly in the 18th century for common domestic purposes, these objects clearly reflect the influence of northern European ceramic traditions.

Hearth Tools

Open-hearth cooking is, simply, cooking over a live fire. This technique has been the dominant method of cooking since the realization that fire transforms food. Surprisingly, for such a basic activity, specialized tools for hearth cooking are a fairly recent phenomenon in most cultures. Typically, the only tools needed for cooking with fire were waterproof containers that withstood heat, and a tool with which to suspend either food or a container close to the direct radiant heat. Every culture has developed its variation on these two requirements, inventing cooking technologies based on materials at hand. Rietz seems to have collected with this fundamental idea in mind. Every culture/geographic area represented in the Collection has some example of tools used for hearth cooking, however the majority of hearth tools in the Collection are examples from the domestic cooking traditions of 18th and 19th century Great Britain and North America (Fig. 9).

English and French Measures

Dating from 18th and 19th century France and England, several examples of individual sets of measures used to verify a particular amount of liquid volume were collected by Rietz. Following



FIGURE 1. Terra cotta vessels from ancient Palestine. Clockwise from upper left: CAS 0389-0443, CAS 0389-0496, CAS 0389-0145, and CAS 0389-0495. Photo credit: Dong Lin, California Academy of Sciences.

FIGURE 2. Greek drinking vessels, 5th century BCE. Clockwise from center: CAS 0389-0188, CAS 0389-0097, CAS 0389-0263, and CAS 0389-0082. Photo credit: Dong Lin, California Academy of Sciences.

FIGURE 3. Persian ceramic serving-ware. Clockwise from upper left: CAS 0389-0272, CAS 0389-0651, CAS 0389-0666, and CAS 0389-0668. Photo credit: Dong Lin, California Academy of Sciences.

FIGURE 4. Knives used for chopping. Clockwise from upper left: CAS 0389-1255, CAS 0389-1079 A,B, CAS 0389-1229, and CAS 0389-1676. Photo credit: Dong Lin, California Academy of Sciences.

FIGURE 5. Knives used for cutting and grinding. Clockwise from center: CAS 0389-1147 A, B, CAS 0389-1099, CAS 0389-0469, and CAS 0389-0183. Photo credit: Dong Lin, California Academy of Sciences.

FIGURE 6. Cutlery. From left: CAS 0389-1639, CAS 0389-1642, CAS 0389-1823, CAS 0389-1826, CAS 0389-1869, CAS 0389-1875, CAS 0389-1876, CAS 0389-1884, CAS 0389-1886, CAS 0389-1921, and CAS 0389-1922. Photo credit: Dong Lin, California Academy of Sciences.

the needs of trade and commerce that erupted from the expansion of markets in the 16th–19th century in western Europe, reliable weights and measures were crucial to the accounting of foods and liquids as commodities. The measuring of both dry weight and wet volume became a matter regulated by the government to avoid theft and inaccuracy. Stamped with official governmental markings of France or England, the vessels in the Collection are cast of pewter and other metals and represent the measuring system of each individual country from which they originated. The measures are not graduated but are sets of containers of fixed value. The French measures employ the metric scale, each measure inscribed with its value: “Litre,” “Demi-litre,” “Deca-litre,” etc. (Fig. 10). The English measures including some examples made of wood, employ the traditional English measuring scale, and are inscribed with values such as “quart,” “pint,” “half-pint,” and “dram” (Fig. 11).

The measures were most likely used as tools of commerce to measure commodities such as milk and cream sold in public markets. Although they resemble modern household measuring cups, these objects predate the common use of household recipes and cookbooks that employed fixed amounts of ingredients. However, it is likely that these tools are an antecedent to household measuring devices.

19th Century Professional Cookware

Haute Cuisine or *Grande Cuisine*, the elite cuisine of 19th century Europe, was rigorously codified and communicated with the development of two written genres, cookbooks and culinary journals and magazines. By the middle of the 19th century, French *Haute Cuisine* had become identified with professional and culinary mastery throughout Europe as well as the United States. The success of this first “modern” style of cooking was dependent on two things: specialized tools and specialized labor. Militaristic in its organization and scientific in conduct, kitchens serving *Haute Cuisine* had clearly defined hierarchies of labor. Cooks specialized in various areas of the cuisine: pastry, sauces, roasting, cold service, hot service or butchering. All of these functions required tools tailored to the needs of each specialist. Known as a *batterie de cuisine*, these kitchen utensils were mass-produced by specialty purveyors of kitchen equipment in prescribed shapes and size. Two areas of the Collection illustrate the level of specialized technology developed for the production of *Haute Cuisine*: (1) an array of copper saucepots, kettles and pans manufactured in France in the later half of the 19th century for the English market (Fig. 12), and (2) a large collection of ceramic, glass, and metal molds or forms for the molding of jellies, aspics, creams and ice cream.

In greater detail, the first group includes a collection of copper cooking ware of about 35 individual objects. Most are flat-bottomed pots with long handles, indicating that they were intended for use on a large, flat-topped range rather than over an open fire. However, some have convex bottoms with a narrow flange 2–3 inches from the bottom for use in a range with direct exposure to the fire. The objects range in size with obvious graduation of volume. A set of six copper, long-han-

FIGURE 7. Chopsticks. From left: CAS 0389-1939A-D, CAS 0389-1940A-C. Photo credit: Dong Lin, California Academy of Sciences.

FIGURE 8. German and Dutch ceramics of 17th and 18th century North America. Clockwise from upper left: CAS 0389-0668, CAS 0389-0651, CAS 0389-0666, and CAS 0389-0272. Photo credit: Dong Lin, California Academy of Sciences.

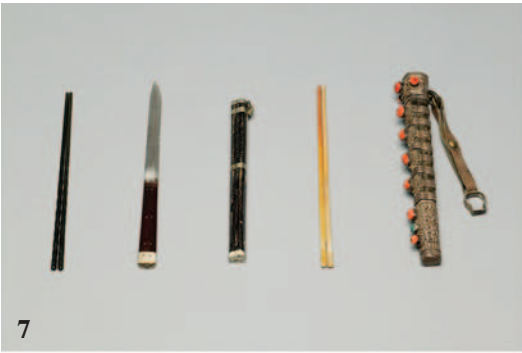
FIGURE 9. Hearth tools. Clockwise from left: CAS 0389-1143, CAS 0389-1144 A,B CAS 0389-1145, CAS 0389-1146, and CAS 0389-1436. Photo credit: Dong Lin, California Academy of Sciences.

FIGURE 10. French measures. From left: CAS 0389-1200, CAS 0389-1204, CAS 0389-1205, CAS 0389-1259, CAS 0389-1260, CAS 0389-1271, and CAS 0389-1272. Photo credit: Dong Lin, California Academy of Sciences.

FIGURE 11. English measures. From left: CAS 0389-1190, CAS 0389-1178, CAS 0389-1443, CAS 0389-1192, and CAS 0389-1177. Photo credit: Dong Lin, California Academy of Sciences.

FIGURE 12. Clockwise from left: CAS 0389-0995, CAS 0389-0854, CAS 0389-1009, and CAS 0389-1074. Photo credit: Dong Lin, California Academy of Sciences.

FIGURE 13. Batterie de cuisine. From left: CAS 0389-0825, CAS 0389-0809, CAS 0389-0826, and CAS 0389-0810. Photo credit: Dong Lin, California Academy of Sciences.



dled sauté pans lined with tin range in size from half of a quart to several quarts, their diameters expanding with the additional volume as they increase in size. A similar set of four sauce pans with lids, used for keeping sauces warm, are also made of copper with tin lining in graduated dimensions. Inscribed on the outside of each saucepan is the note: "Made in Paris for E. Bennet, 55 Dean Street, London W"(Fig. 13).

The second group of objects is a vast collection of molds and forms. These objects were developed for use in Europe during the late 18th century for elaborate cold buffets. Jellies and aspics, made from gelatin rendered from veal and pork, held a prominent position in the cuisines of the gentry and the middle class in Western Europe from the 16th century until the beginning of the 20th. It is hard to imagine the prominence and attention that molded jellies and aspics held in European formal cuisine from the late Renaissance, when the technique was refined, to the 19th century when the display of molded jellies on buffets took on an almost architectural grandeur. The intention was spectacle, a tradition carried over from the high dining of the Middle Ages when allegorical displays of food played a central role in royal banquets. As cuisine moved into the Industrial age, the manufacturing technologies of glass, ceramics and metal work became less costly and more sophisticated, offering the opportunity to greatly expand the shapes and sizes of molds.

The Collection contains a vast sampling of the differing styles, sizes and material of molds and forms. Most are 19th century of English and French manufacture. Shapes vary from geometric figures to almost life-like renderings of fruits, vegetables, and flowers. In addition to the jelly molds, there are also forms for molding butter, ice cream, almond milk, and custards. These molds are not rare because the fashion was so pervasive that mass production of molds guaranteed their ubiquity.

SIGNIFICANCE OF THE RIETZ COLLECTION AND STUDIES OF FOOD

A basic question that arises in the course of studying the Collection is what meaning it has in the context of the broader study of cultural practices surrounding food. Nourishment is a necessity and, thus, it is reasonable to state that the human concern for food and its preparation has been and continues to be a primary human activity. For such an essential activity, there has been relatively little notice paid to the recording of the history and practice of this fundamental aspect of daily life.

The basic reason that this field of study has been virtually ignored until recently, is that philosophical tradition has tended to privilege questions about the rational, the eternal, and the abstract and to give less attention to questions about embodied, concrete, practical experience. Physical, transitory, and completely ordinary experiences like eating are considered less valuable because they distract from the pursuit of more abstract goals. Food has not been considered a topic worthy of scholarly attention because it has traditionally occupied the realm of women's work and the work of the under-classes of society, which have been traditionally ignored by Western scholarship. Western philosophies, like the cultures in which they emerge, historically have discounted the value of women's activities. Work has been defined in such a way as to exclude reproductive labor and unpaid activities in the home (Curtin and Heldke 1992).

Another barrier to the academic study of food is the fundamentally ephemeral quality of the everyday. The people of the past who performed the tasks of cooking and preparing food were largely illiterate. Knowledge of cooking was experiential and informed by an oral tradition. Cooks learned their skill through the direction of others and by rote practice. They left little record or description of the processes that occupied their days. The utilitarian nature of tools used daily and made of materials available at hand meant they rarely survived beyond their immediate use. Obsolete or flawed tools were discarded or reworked. Hence, little evidence remains and little documentation exists to explain their use.

The relegation of the study of the cultural and social aspects of food and cookery to the margins of history and social sciences has recently begun to reverse. The history and technologies of cooking and eating have begun to achieve marginal recognition in the last four decades as legitimate aspects of social sciences, history, and material culture studies. A growing body of research and writing has replaced the past trend of ignoring or marginalizing such study. Consequently, food studies have become more acceptable as the subjects of serious scholarly investigations. In the 20th century, the enormously influential historical school associated with the French journal *Annales: Economies, Societes, Civilisations* stimulated academic research into both the material and cultural conditions of everyday life. Marc Bloch and Lucien Febvre, scholars conversant with the new sciences of sociology, geography, psychology, and anthropology, started the journal in 1929. Through histories of ways of life and ways of thinking, from the Middle Ages to 1800, the journal focused on description of “economies, societies, and civilizations,” such as the study of diet, ingredients, and food habits. More recently, the annual Oxford Symposium on Food and Cookery, founded by Alan Davidson and Theodore Zelden, has provided a forum and outlet for the growing body of research and writing about food and eating. This has led to additional symposia and academic journals devoted to the study of not only cooking and eating but domestic life in general.

Cultural anthropology has long recognized the social importance of food preparation and eating as a means of exchange and communication and as a means of expressing both social stratification and social solidarity. Classic debates have focused on systems of classification of edible and inedible animals and plants, the nature and logic of food taboos, the significance of ritual and ceremony in food practices, and the social role of food as an object of exchange (Levi-Strauss 1964; Simoons 1961, 1994; Douglas 1972; Mintz 1985; Richards 1939). In a parallel, but largely independent development, historians have increasingly been influenced by the approach of cultural anthropologists to the study of society. Ethnography has proved to be an invaluable tool for not only anthropologists but also cultural and economic historians as a method of investigating existing traditions and practices around food that echo those traditions of the past (De Certeau et al. 1998; Issac 1983; Hilliard 1972).

The sources used by historians and, to a lesser degree, anthropologists are generally archival documents such as correspondence, journals, diaries, wills, inventories, and the household accounts of individuals and institutions. These principal sources range in diversity and scope but remain problematic because so few people engaged in food practices were able to read or write (Theophano 2002). Until the middle of the 19th century, the majority of texts about food and cooking including cookbooks, menus, inventories, and manuals of etiquette, were written by and for those expressly not engaged in the actual work of obtaining and preparing food. These documents supply information such as how much of what ingredients were eaten by members of different classes at various times and places. They rarely record in detail how foods were prepared, due to the general assumption that basic knowledge of the kitchen and its technologies was understood (Wheaton 1983).

While many social historians assume the evidential priority of the written word, the study of objects or artifacts as primary source material has been a concurrent development in the fields of folklore, archaeology, and others engaged in the study of material culture (Glassie 1968; Deetz 1977). If the goal is to encounter and make sense of an alien mind and time, whether that of a 19th century English cook or a 9th century Persian gourmand, then complex material objects, such as tools or art, are crucial. These objects are whole texts, each one an objectification of thought, process, and tradition (St. George 1988). Culinary artifacts, thus, become more highly valued as primary source material since archives and published documents with references to food are rare, and meaningful descriptions of food preparation processes carried on by and for the less affluent classes are almost non-existent.

CONCLUSIONS AND PROSPECTUS

The Rietz Collection of Food Technology offers the opportunity to explore the technologies associated with food across a spectrum of multiple cultures and time periods. Although the Collection is not a comprehensive representation of any single tradition of cultural foodways, it does offer insight into numerous traditions. The collection is comprised of a series of small collections of artifacts and tools that have been developed within specific traditions. These objects have enormous potential to illuminate an area of human activity that lacks a substantial written record. Areas of potential research include the investigation into the relationship of ancient Mediterranean trade goods and the spread of food technologies; Islamic tableware, ceramics and the rituals of dining; the relationship between Colonial American food technologies and those of northern Europe from the 17th–19th centuries; the regulation of measurement in 18th century European domestic markets; as well as the widening gulf between the techniques and tools of the professional kitchen and those of the domestic cook in the 19th century. It is hoped that in the future more scholarly interest will be focused on the objects in the Collection.

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