

# 'Micro-batching' grows up

By Curtis Vreeland // CONTRIBUTOR

At one end of the room, grubby brown beans are being dumped unceremoniously down a metal chute. At the room's other end, a cooling tunnel is gently disgorging elegant brown bars. A funk of heavenly, tropical aromas fills the air. Changing those humble beans into luscious, expensive chocolate is alchemy.

Provo-based Coleman & Davis is but one example in the growing trend of the bean-to-bar movement. These artisans make chocolate from scratch; that is, buying the beans and processing them into the finished, go-to-market product. In the trade, they are called chocolate makers to differentiate them from chocolatiers who buy couverture and mould it into bars or bonbons.

Driving this passion is their commitment to old school craftsmanship, explains Coleman & Davis' co-owner Morgan Coleman.

"Our goal is to present the maximum amount of flavor as possible from these amazing [single origin] beans. Having control over every possible variable in flavor development of the chocolate bar, being able to do this from start to finish."

Such craftsmanship has awakened America to a "new chocolate renaissance." That's how *Candy Industry Magazine's* Editor-in-Chief Bernie Pacyniak described the phenomenon in his January 2015 editorial. He isn't alone with such an opinion. *Dessert Professional* Editor Matthew Stevens says, "the American bean-to-bar market excels in product innovation, marketing and packaging."

This exciting stage of the American craft chocolate market is not unlike what happened in the mid-twentieth century to the California wine industry. This wine industry, nurtured by an improvement in wine-making techniques, a renewed focus on quality over quantity and Mondavi's decision to label his wines by grape variety, rather than generic European locations — Burgundy, Chablis, etc. — fueled a boom that has never really stopped.

The crowning glory came in 1976 when California wines won top awards in a blind tasting in Paris, an event hereafter immortalized as the "Judgement of Paris." By the following decade, the California "grape rush" had hit the national psyche, as lawyers and doctors bankrolled vineyards and *Dynasty*, a TV series about a Napa wine family, enthralled American audiences.

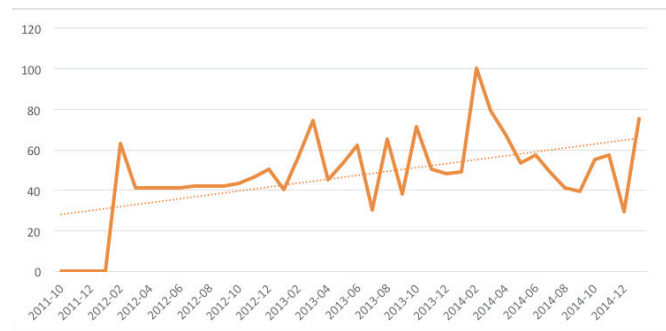
One can get a sense of how new and explosive this chocolate rebirth movement is by viewing a Google Trends search on the term "bean-to-bar." Until as recently as three years ago (December 2011) the term was unknown in the global press. But by the following year,

news stories had rocketed to 40 per month and within three years (December 2014) 80 per month.

So how big is the American craft bean-to-bar segment?

The confectionery market research firm Vreeland & Associates estimates this niche consists of about 1,000 barsmiths, of which about 800 are serious kitchen-based hobbyists monetizing their passion by selling at farmers markets, a popular first rung in the ladder of product commercialization. Another 100 are semi-professional, working part time as they hone their craft and build market share. The remaining 100 are full-time professionals having earned regional or national recognition. Many of their names can be found on bean-to-bar lists maintained by the Ultimate Chocolate Blog and/or Ecole Chocolat, which has trained many of them over the years.

Assuming that each of these latter barsmiths averages about \$2 million in sales, this would value the bean-to-bar niche at \$200 million.



Google Trends search on news headlines featuring "bean-to-bar chocolate."

And the niche keeps expanding.

A popular entry-level choice for chocolate-making equipment is Atlanta-based CocoaTown. Owners Andal Balu and her husband M. Balu estimated that the number of quotations for their equipment increased by 20 percent in 2013 and 15 percent in 2014, with the latter year's lower percentage due to a widening market base, rather than a decline in interest.

The Great Recession can be credited as having a catalytic effect on this chocolate renaissance. It forced many talented individuals out of their corporate jobs and some of them decided to follow their passions, which involved making chocolate. And many of them were likely inspired by the success of the early bean-to-bar pioneers, like John Scharffenberger (Scharffen



Coleman and Davis beansmiths Phil Davis (left) and Morgan Coleman proudly pour beans into their new JAF Inox winnower.



Ed Seguire, Seguire Cacao, utilizes a battery of four Cocotown melangers to make liquors and chocolate for the International Cocoa Awards' Cocoa of Excellence Programme, Salon du Chocolat, Paris.



At International Culinary Education's new bean-to-bar chocolate lab, Creative Director and Chef Michael Laiskonis (center) instructs students on its new Cacao Cucina equipment.

Berger Chocolate Maker), Steve DeVries (DeVries Chocolate) and Art Pollard (Amano Artisan Chocolate).

This post-Recession wave of barsmiths was assisted by the confluence of several circumstances, which gave this niche significant market traction. One factor was the expanded availability of fine-flavor cacao varieties. It's like a painter suddenly having access to a wider palette of colors.

Some credit for the expanding cornucopia of cacao varieties belongs to the Heirloom Cacao Preservation Initiative, which seeks to identify new great tasting cacao heirlooms. As its website explains, "heirloom cacao are the diamonds of cacao — cacao trees and beans endowed with a combination of historic, cultural, botanical, geographical, and most important, flavor value." Gone is the old school notion that there are just three types of cocoa: criollo, forastero and trinitario. The project has identified eight heirloom varieties, to date.

The Paris Salon du Chocolat hosts the International Cocoa Awards, which honors cocoa producers and introduces chocolate makers to the widening circle of fine flavor cacao. That's where, in 2013, Coleman recalled sampling every bean

available and making connections with some of the producers.

A second factor is the barsmiths' tendency to buy direct from the farmers or cooperatives; thus, insuring greater control over their supply chain. They work directly with producers to tweak production and post-harvest practices that produce better and more consistent flavor development. The producers, in turn, benefit because the higher premiums they receive through Fair Trade certification improves their socio-economic well-being.

Being a new company, Coleman & Davis is buying fermented beans and working on gaining expertise with roasting and conching. But Davis anticipates a time in the near future when they will be working closely with his producers to fine-tune the fermentation techniques.

A third factor is the existence of a trade association to support and promote the movement. The Fine Chocolate Industry Association has approximately 60 business members, according to association president Pam Williams. Founded in 2007, the association has developed industry standards and a code of ethics and bestows Fine Chocolate Recognition of Excellence

awards to honor industry professionals and companies "for their significant contributions to our segment of the industry." It hosts bi-annual conferences at which educational sessions on varietals, flavor development, packaging and marketing are presented. These well-attended conferences are a sort of idea-generating crucible for its attendees.

A fourth factor helping support the niche is the recent availability of equipment scaled for craft chocolate production and priced economically. Coleman & Davis, for example, purchased a system from JAF Inox able to produce 1 metric ton of chocolate per week, but which is very customizable.

"This line gives us an incredible amount of flexibility; we can do extensive testing out with very small batches of beans — like 50-100 micro-batches — to find what flavors we really want; what the optimal flavors are with those beans."

As the craft bean-to-bar niche grows in popularity, so too has the need to recognize it as a distinct style of chocolate making. The International Chocolate Awards, the world's only independent multi-country premium chocolate competition, announced in February that it will present a

separate prize or category for micro-batch plain/origin bars.

In short, the confluence of talented crafts people, greater availability of fine flavor cacao, recognition of farmers' critical role in supporting flavor development, availability of equipment scaled to the needs of this niche and competitions to reward such exceptional talent has helped nurture this new renaissance.

"It does the body and soul good to see so many artisan candy makers and chocolatiers cropping up throughout the United States and elsewhere," Editor Pacyniak noted. "I wish all those entrepreneurs courage and confidence, perseverance and patience, attention to detail and inspired artistry as well as a good dose of luck and love."

And consumers have responded with gusto, eagerly participating in chocolate appreciation workshops and, just as importantly, supporting the trend by purchasing the bars. After a chocolate tasting at Coleman & Davis' retail shop, called Taste, one customer wrote on the company's Facebook page:

"Easily one of the best food experiences I've had, chocolate tasting. [It] was a lesson in discernment and one that awakens all five senses. Whether you're a chocolate aficionado or a casual fan, a date at Taste is sure to leave one more knowledgeable, satisfied and willing to explore and broaden one's preferred chocolate tastes."

And that's manna for the chocolate industry: a growing base of knowledgeable consumers.

A listing of the most popular bean-to-bar making equipment available on the U.S. market follows:

### Equipment

When the bean-to-bar market was starting up ten years ago, the only available chocolate making equipment were either expensive new machines designed for industrial-scale manufacturing or vintage pieces budget-priced due to their worn condition. Many of the early barsmith pioneers — Scharffenberger, Amano and DeVries — had prior manufacturing backgrounds and were capable of repurposing the old machines to meet their needs. And, undoubtedly, some of those heirlooms fit the lore of

hand crafting chocolate using traditional European methods.

Now there are several manufacturers offering equipment scaled specifically for this craft niche. For hobbyists with both limited budgets and technical expertise, CocoaTown offers *CocoaT*, an entry-level line of equipment that is easy to master and — for under \$2,000 — attractively priced. The company has equipped hundreds of first-time chocolate makers with reliable and competitively priced equipment.

Cacao Cucina offers a mid-range product line that includes more control points to aid with product consistency, but at a higher price point. JAF Inox, with guidance from its industrial-grade parent (Royal Duyvis Wiener) has designed a higher-end equipment line containing sophisticated control points that, naturally, are the most expensive of the three systems. In short, these three manufacturers cover a range of barsmith's equipment needs, whether it's for a Chevy, Buick or Cadillac approach to chocolate making.

As their needs grow for more sophisticated process controls and higher capacity, barsmiths might either add higher capacity CocoaTown machines or consider another manufacturer. Two leading companies serving this niche are Bottom Line Process Technologies' Cacao Cucina and JAF Inox, a division of the leading global manufacturer Royal Duyvis Wiener. Their systems range from \$100,000 to \$600,000, which is a fraction of the cost of an entry-level system from an industrial-grade equipment manufacturer.

"These systems give customers the ability to control each step of the process to produce the product they want," explains Jochem Dekker, v.p. of KOCO Inc., the U.S. agent for the Royal Duyvis Wiener group.

All three manufacturers provide an integrated solution — from roasting through tempering — for making micro-batch bean-to-bar chocolate. An integrated manufacturing solution has the advantages of offering design consistency, scalability and ease of support. Although two manufacturers make them, I did not include a butter

press, given that an aspiring barsmith can readily purchase cocoa butter. Nonetheless, a system that includes a press provides the opportunity for a complete same-origin chocolate bar.

All three of these micro-batch systems are modular and scalable, allowing barsmiths to supplement pieces, say a set of melangers to simultaneously process a batch of roasted beans using different recipes without having to clean the equipment between batch runs. They can also be used as laboratory-size systems to test a new product concept. JAF Inox systems, for example, can be found in the R&D sections of several major global chocolate manufacturers. Cacao Cucina recently sold a system to the New York City-based Institute of Culinary Education for its new Artisan Chocolate Studio.

There are important differences in technology among the three systems. Roaster specifications provide a case in point. The Cacao Cucina roaster offers a more sensitive temperature control sensor for product (the beans) temperatures, while JAF Inox's roaster contains two temperature probes and a PLC to keep track of both air and product temperatures simultaneously.

"Given that bean batches from the same origin might vary in moisture by as much as 1 percent to 2 percent, this heightened level of protection insures a more uniform and repeatable bean roasting profile, from batch to batch," says Dekker.

For particle reduction, CocoaTown's stone mill-based melangers are inexpensive basic grinders that have served cooks for millennia and, as such, have old world appeal. This technology combines refining and conching and takes up to several days to complete. The next step in particle refinement technology involves ball mills that replace porous granite mills with easier-to-sanitize stainless steel and offer slightly quicker refining times. Ball mills use the wet conching method that has the drawback of lengthening the processing time to evaporate off the excess moisture.

JAF Inox uses a batch knife mill to grind the nibs into a course paste and incorporate sugar and milk powder. The final processing is accomplished through a five-roll refiner and conch, an equipment combination that permits



dry conching. Dry conching allows for shorter processing times, as low as six hours, as the moisture can be driven off more effectively. The five-roller refiners can grind particles down to 15 $\mu$  with a tighter particle size distribution, resulting in better chocolate viscosity. If needed, cocoa butter is added at the end of the conching cycle.

For this micro-batch equipment review, I asked each manufacturer to equip a complete chocolate making production line at capacity levels typical of their customers' needs. In reality, however, chocolate makers, as their needs evolve, often purchase equipment a la carte from several sources. While our three profiled manufacturers offer systems that can scale up to meet larger production runs, at these higher capacities, barsmiths' particular needs would be too unique to include in this introductory level article.

## cocoatown

### Cocoa Town – CocoaT

**Bottom line:** Aspiring bean-to-bar chocolate makers can get started with as little as \$600 and add equipment as needed for different pre-tempering steps for under \$2,000.

**History:** Andal Balu and her husband M. Balu entered the food processing industry a quarter century ago by successfully marketing cost-effective appliances for creating authentic Indian home cooking. Then in 2006, recognizing that, according to Andal, “chocolate was being transformed from a sin food to a health food,” they saw an opportunity to manufacture *Grindeurs* and melangers for aspiring chocolate makers and subsequently launched CocoaTown.

“Our vision is that money should not be a problem for getting started,” noted M. Balu. By effectively lowering the costly barrier-to-entry for manufacturing chocolate, CocoaTown’s equipment has supported the explosion of American craft chocolate makers. “We created a niche market that didn’t exist before.”

“We have created chocopreneurs around the world. What gives us pleasure is to hear a customer tell us that they are in a



**CocoaT Power Cracker**  
Specifications: Capacity 60-100 lbs./hr.; stainless steel rollers and hopper; and metal gears.



**ECGC-65A Grindeur**  
Specifications: Capacity 65 lbs. of nibs to yield up to 100 lbs. of chocolate liquor, depending on recipe; multi-purpose, can grind almonds, hazelnuts, pistachios, etc. to make nut butters.

thriving business because of our machines,” explained M. Balu. “The market is expanding like Starbucks, with more and more shops specializing in chocolate, not just drinking chocolate, but eating bonbons.”

How can you get maximum benefit with minimum upfront investment? M. Balu offers this critical advice, “Start by buying a melanger to grind beans, the most time-consuming step. Then, you can invest into standardizing pre-grinding /melanging steps such as roasting, cracking, winnowing etc., through the other machines CocoaTown has added.”

CocoaTown has since expanded to supplying a full range of chocolate-making products that are being used by about 2,000 chocolate makers in more than 60 countries. In 2013, the Fine Chocolate Industry Association awarded Andal Balu with the Innovation in Fine Chocolate Products Award.

**Support:** For pre-sales, prospective customers can send beans and recipes to CocoaTown for the company to make a trial

batch. Post-sales support and training is available at headquarters or via Skype. The company is considering the option of making a rental “kitchen” available for chocolate makers’ use.



## Bottom Line Process Technologies - Cacao Cucina

**Elevator speech:** Bottom Line Technology’s Cacao Cucina turnkey system is manufactured for “just right in the middle” chocolate making, not small micro-production nor a large commercial factory.

**History:** The owners’ backgrounds are in development, engineering, and plant management for large confectionery companies. Then 20 years ago, they started a consulting firm called Bottom Line Process Technologies, Inc. In 1999, the company expanded into fabricating basic sugar confectionery equipment and in 2010, it started offering turnkey bean-to-bar chocolate systems under the name Cacao Cucina. To date the company has machines installed with over 50 clients in 22 countries around the globe.

**Support:** All customers have the opportunity to visit our facility in Largo, Fla. for pre-shipment machine acceptance and train-



### Cacao Cucina Chocolate Maker (CM-10 or CM-25)

Specifications: available in two capacities: 10 kg./25 lbs. or 25 kg./55 lbs. per batch; stainless steel, temperature controlled, stir ball mill with product recirculation screw pump and temperature controlled product air blower; variable speed agitator; magnetic trap in discharge valve and vacuum discharge system. Optional touch screen PLC control panel with timer functions, alarms and stored recipe entry.

## Special Report // The bean-to-bar Phenomenon



**Cacao Cucina Winnower (WINN-45)**  
Specifications: Capacity: 45 kg /100 lbs of roasted beans per hour; pressure adjustable, variable speed bean breaker; three vibratory product screens; separate fines delivery; vacuum system for shell debris. Stainless steel breaker, product screens, discharge chute and frame.

ing, free of charge. For on-site training, we offer two levels of support. If the client can handle installation, and just wants someone familiar with the machines and process to be there when they start up, we will send a technician. If they need more assistance with installation and technical issues, we will send our engineer, who also happens to be the president of the company. We also supply a detailed manual with videos with every machine. Skype conferences are another way we connect with clients.



### JAF INOX

#### Royal Duyvis Wiener - JAF Inox

**Elevator speech:** JAF Inox can supply bean-to-bar turnkey chocolate production systems in capacities from 2½ to 200 kilos per hour. It offers the most complete range of equipment, from bean cleaning, roasting, winnowing, conching, tempering, moulding and enrobing.

**History:** In 2006, when JAF Inox was constructing its chocolate factory, it couldn't find domestic manufacturers of small-scale equipment and importing the machines would have been cost prohibitive, so it decided to make its own. The Sao Paulo, Brazil-based company was not new to equipment manufacturing; it had been making ceramic moulding machines for some time. Its first

equipment was so successful that other aspiring chocolate makers were soon asking to buy machines. In 2008, JAF Inox sold its first commercial bean-to-bar system to a cocoa farm in Bahia. It now has about 20 customers, from craft-size to R&D centers of major chocolate manufacturers in South America, USA, Asia, Africa and Europe.

"We aren't targeting the hobby or small producer market, but rather the premium chocolate maker who wants more control and precision over the process, yet still be simple in design and balanced with cost," explained General Manager Adriano Sartori Pedroso.

JAF Inox is a division of Royal Duyvis Wiener, a leading global manufacturer of cocoa and chocolate processing equipment that was founded in 1885 in the Netherlands. In 2011, Her Majesty

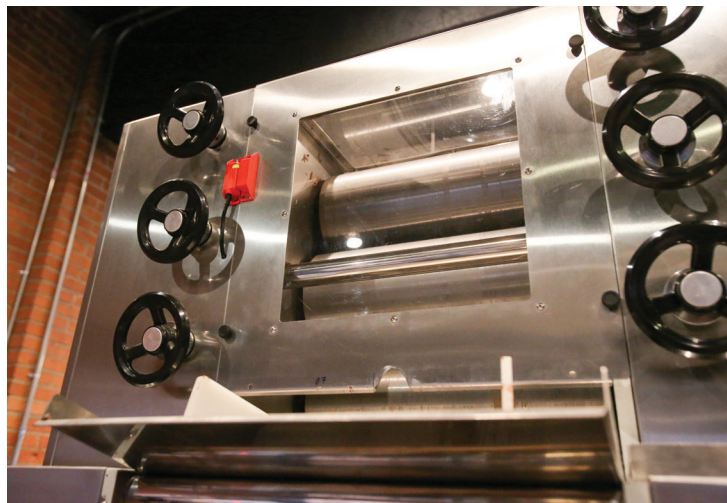
Queen Beatrix of the Netherlands granted Duyvis Wiener the designation of "Royal." In 2013, Royal Duyvis acquired the Brazil-based JAF Inox and the first complete system in the United States was installed in January, 2015 at Coleman & Davis Artisan Chocolate, Provo, Utah.

**Support:** World-wide technical support and spare parts. Training and recipe development are available at Royal Duyvis Wiener's plant in Koog aan de Zaan, the Netherlands.

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#### JAF Inox 5-Roll Refiner

Specifications: Capacity is 60 kg/hr. and is designed for particle reduction to a fineness of 15 metric microns; includes a stainless steel chiller and has controllable roll positioning, speed, and temperature control. Photo location: Coleman & Davis.



#### JAF Inox Roasters & Winnower

Specifications: starting from the left side, moving right shows a 60 kg/ batch roaster, 5 kg/ batch roaster, cyclone (black machine) specifically for the winnower, and the winnower which is 60 kg/ hr; both roasters use conduction heating, are made of stainless steel and have two sensors each for monitoring bean and heat source temperature. Both roasters can be used for both bean and/or nib roasting. The winnower includes a cyclone and has 5 decks with adjustable suction for efficient skin removal. Photo location: Coleman & Davis.