







COCOA COFFEE

A Cross-Sensory Exchange

BY BETH ANN CASPERSEN

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OFFEE AND CHOCOLATE have long been known to be pairing soul mates. These two food products have risen up and taken the world by storm through mass market. And as the mass markets took over, the specialty segment split off to differentiate and celebrate the uniqueness of coffee and chocolate. The two industries have so much in common—from sourcing to the final product—and so much to learn from one another.

The specialty coffee industry has embraced a culture of apprenticeship and learning by doing, but today our industry is exploding with learning and sharing opportunities. The cocoa industry is on a similar path to opening up, working together to preserve heirloom cocoa, diving more deeply into genetics, and sharing more information.

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On the other hand, the cocoa industry has been historically secretive about sourcing, selection, breeding and flavor. Even more secretive are the ways of the chocolate maker and the processes that take place behind closed doors, Sound familiar?

The product you know as chocolate is a result of many processes, beginning with raw cocoa beans. Cacao is more formally known as Theobroma cacao, and this tasty food product has a long and interesting history that spans thousands of years. This ancient plant is believed to have originated in the jungles of South America, where it eventually migrated north into modern-day Mexico to be celebrated by the ancient Mayans for its medicinal qualities and pure enjoyment.

Today, cocoa is a widely produced and heavily traded commodity, growing in more than 20 countries from Peru to the Philippines. From specialty markets selling high-end chocolate in New York City to a tiny corner store in the high Andes, chocolate treats are available in nearly every corner of the world.

Chocolate is a multifaceted product. As a consumable, it is used to cook and bake, and it exhibits a wide variety of natural flavors that reflect terroir, botanical variety, and many of the same things we look for in specialty coffee. As a product high in antioxidants, cacao is known for its medicinal qualities, and it is widely used for health and beauty products. Cocoa is traded as an international commodity, and the vast majority of the product is purchased as a consumable. It is here that we find that cocoa is divided into two segments: fine

cocoa and bulk cocoa. The latter has been described as "a world of grey monochromatic flavor," while fine cocoa—a tiny segment of the industry—is sought after specifically for flavor.

A UNIQUE PROJECT

As a purveyor of both products, my company, Equal Exchange, has had the unique opportunity to team up with TCHO Chocolate in San Francisco to apply for a cooperative grant from USAID to work on both coffee and cocoa productivity and quality in three Latin American countries— Ecuador, Peru and the Dominican Republic. Over the past two years, a team of more than 30 agronomists, financial experts, lab technicians, university students and managers from both Equal Exchange and TCHO Chocolate have been working together on this project. Our goal: to make improvements through processing technology, provide on-the-ground expertise, install chocolate liquor tasting laboratories, implement lab protocols, and carefully craft experiments and track data through our online platform called Cropster (which provides services for the cocoa and coffee industries). Together, we are working with more than 5,000 producers in coffee and 13,000 in cocoa in five different small farmer cooperatives.

With the on-ground work in action, we wanted to dive more deeply into the physical and sensory analysis used to determine the quality of fine cocoa. How do you determine the quality of cocoa? What kinds

of systems are in place, and who uses them? What are some of the useful tools we use in coffee, and are they applicable in cocoa? During a group meeting for the project, Todd Caspersen, director of purchasing for Equal Exchange, asked, "What if we did a cross-sensory workshop with coffee cuppers and chocolate tasters?" The idea had traction. We could use some of the lessons learned in coffee and establish a set of standards as a guide.

Coffee and cocoa play important cultural and economic roles in Peru. Both products have been internationally recognized for their quality through forums like the SCAA Coffees of the Year and the International Chocolate Awards. As a primary focus for the grant project, we chose Peru to begin looking at some of the current systems used in cocoa and to work with participants that represent the supply chain to create a universal standard.

Our workshop brought together coffee and cacao tasters within the project and invited judges from the national Peruvian association of cocoa farmers (APPCACAO) to the cross-sensory event. Over the course of four days, we hosted 16 people and led

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them through coffee and cacao exercises that both challenged our thinking and propelled our ideas forward.

ESTABLISHING STANDARDS FOR PRODUCERS AND BUYERS

We should always keep the consumer in mind when we buy or sell products, but source, processing and a whole host of factors determine the ingredient—in this case, raw cocoa. Chocolate liquor tasting is completely different from tasting a milk chocolate bar, which contains cocoa, sugar, cocoa butter, milk and more. Much like in coffee, cocoa tasters are working to define the raw ingredients, to eventually convert into a delicious creation to offer the end consumer. That said, you have to start by looking closely at the raw ingredient: cacao. In the workshop, we wanted to begin by creating standards for the producer through to the cocoa buyer.

There are a variety of sensory forms used to taste chocolate liquor, from simple to complex, to experienced veterans who use the "we know it when we taste it" definition. A universally accepted tasting form and a clear definition for what fine cocoa is do not exist as they do in coffee. Coffee industry professionals may or may not agree with the Specialty Coffee Association of America cupping form or how the SCAA defines specialty coffee, but we can say that the standards are well





Left: Leon Rufino with open cocoa pods. Right: Cocoa nibs and cocoa beans.

documented, defined and used around the world. The SCAA standards in coffee have helped to empower various people along the supply chain. Could a universal standard do the same for fine cocoa?

John Kehoe, vice president of sourcing and development at TCHO Chocolate, explains it as a "core concept of mutual self interest. We (the fine cocoa industry) need specific flavors in high-quality beans. To achieve that, we need producers to speak the same language of flavor that we do. Only this will allow producers to supply better quality beans (based on flavor), get better prices, and access better markets with more reliable, engaged buyers."

A major goal of the workshop was to create clear, defined, written definitions and standards that will empower the whole supply chain.

David Contreras, quality manager of the cooperative ACOPAGRO and a national Peruvian judge, agrees. "I think it is an important

tool for producers," he says. "It would give them greater negotiating capacity, at the same time it would help them to improve their processes, understand the level of cocoa [quality] and genetic quality that they should cultivate."

Martin Domínguez Vances, coffee and cocoa plant manager of Nor Andino in Piura, Peru, provides a unique perspective because his cooperative works in both coffee and cacao. He was supportive of the work to create more formal standards. "It's easy to talk about the quality of coffee in coffee because of the developed standards," he says. "In cacao the way to evaluate the quality is different; some [buyers] are more developed than others and this is difficult, we don't know if we are speaking the same [language]."

THE PHYSICAL: MORE ABOUT COCOA

The outside of a cocoa pod looks like a small football or a tiny blimp, with lateral lines that mark the surface. Ripeness is judged by a combination of color, size and the presence of a hollow sound when tapping on the pod, which means that the mucilage, known as the baba, has pulled away from the sides of the pod. Using a machete, the pods are manually split down the center to reveal the beans inside. Inside a freshly cut cocoa pod is a white, sticky paste with bumps—those bumps are cocoa beans wrapped in a soft mucilage

that encapsulates each one individually, with a network of webbing, or baba, attached to the outer pod.

The mucilage protects each bean like a baby during development. The aroma of the freshly cut pod is fresh and floral, while the taste

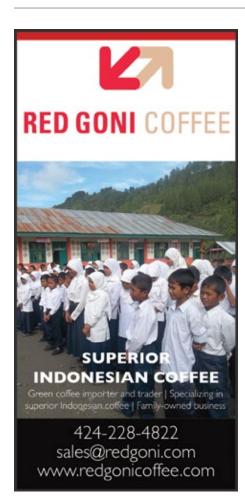


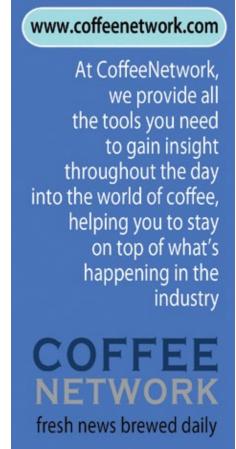
freshly cut cocoa pod.

of the mucilage is sweet and honey-like, with a soft, slippery texture. Enclosed in the delicious tropical fruit pulp are 30 to 50 beans, which are typically bitter and astringent when eaten. To ensure a quality cocoa, ideally the beans would be put through a fermentation process that ultimately reduces bitterness and astringency and exposes new and complex flavors.

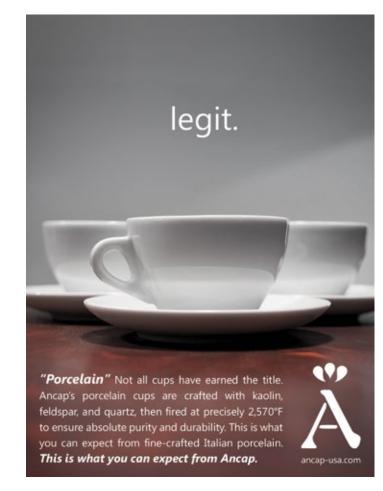
The beans are removed from the pod to begin the fermentation stage, which can be performed in a variety of ways. Nothing is added to the cacao during fermentation—the mucilage naturally breaks down—and aeration plays an important role. In West Africa, for example, the cacao beans are typically placed on top of and covered by banana leaves that are placed in a radial pattern. In Latin America, producers will often use baskets or wooden boxes. With either system,

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Cocoa & Coffee (continued)

it is important that the cacao beans are protected from light and air. Over the course of two to eight days, cacao is either stirred or moved from box to box during the process of fermentation. The size of the box used in our Latin America example will depend on the amount of cocoa being fermented; in general boxes are approximately 1 meter cubed. In order to better understand how this works, imagine three boxes configured like stadium seats, also known as staircase fermentation. The cacao is put into the top box for the first of three steps in the fermentation process.

Brad Kintzer, the chief chocolate maker for TCHO and a trained botanist, explains, "The first stage is yeast fermentation, where the yeast is consuming sugars and converting them to alcohol and carbon dioxide, also breaking down the pulp. This is anaerobic fermentation; the less oxygen the better. The process takes about 48 hours, and the alcohol and juices drain out of the

During fermentation, a variety of chemical changes occur. Cocoa beans are then moved to the second box in the configuration. Kintzer says, "Here you also have anaerobic fermentation with bacteria that are producing lactic acid." After a few days, cocoa beans are moved to the third box and enter their final stage of fermentation, where there is more oxygen introduced and acetic acid (think vinegar) is produced. "The goal is to remove the pulp and create complex chemical changes through the fermentation process," Kintzer continues. "Without fermentation, you are left with the cocoa beans' natural profile, which tends to be higher in bitter and astringent flavors." As you might imagine, these are not desirable characteristics in cocoa.

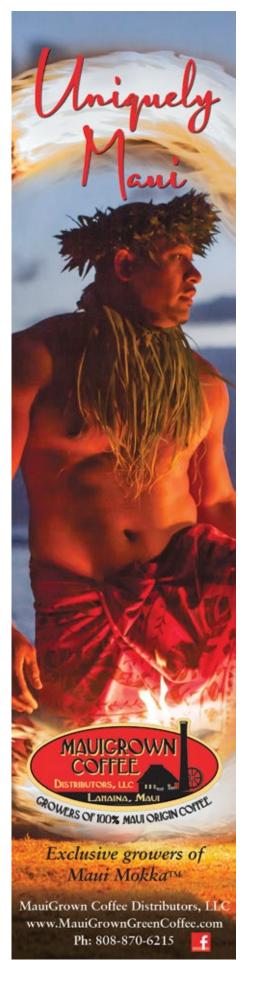
As the beans complete their fermentation, their color reveals certain qualities about their variety, development and potential flavor. Like coffee, some cocoa beans are mechanically dried, while others are spread out onto raised and covered drying beds, where they spend a minimum of three days and no more than two weeks absorbing the sun's rays, weather permitting.

The outside of the beans only tell part of the story. In order to truly understand the quality of the cocoa, a device known fondly as the guillotine is used to perform a cut test. Fifty beans are carefully positioned in a rectangular metal piece that contains small cavities, where the beans are placed and prepared for their "execution." The beans are then shut in what looks like a backgammon case and a large, sharp, thin blade is forced down the center of the box to cut the beans in half. It's a bit like watching a magician at work, but the process of cutting requires much more strength than I would have given these little beans credit for. To understand if the beans are good, cocoa experts open the case and evaluate the beans. Cocoa beans range in color, from white to a deep violet-purple in their unfermented state to golden caramel brown or close to black after fermentation.

Much like the SCAA green arabica coffee grading standards, a representative sample of the cocoa lot is sorted through this method. Unlike coffee, the cocoa sample must be cut and cannot be fairly evaluated without the cut test. However, the true test of quality is in the flavor, not the cut test alone.

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ROASTING COCOA BEANS

Much like in the coffee industry, there are various types of machines used to roast cocoa that incorporate air, gas, electricity and fire. The quantity of cocoa to be roasted, origin, variety, humidity and desired flavor profile all help determine the parameters for a

roast. Just like coffee, cocoa beans vary in size, which can affect the flavors you want to bring out in a roast. There are two distinct types of roasting: whole bean roasting or nib roasting.

In whole-bean roasting, cocoa beans are roasted in the shell and then the shell is cracked and removed before they are used to make different chocolate products. Cocoa nib roasting is a bit different because there is an additional step. Cocoa beans are first



put through a micronizer, which Kintzer explains, "is a vibrating conveyor belt where beans receive a strong direct heat for 1 to 2 minutes. This heats the outside of the shell and puffs it up so that the shell can be easily removed."

Beans are then cracked in the second stage to remove the shell, and the broken pieces of cocoa beans (which are now referred to as nibs) are then separated by a vacuum-pressure winnower. The nibs are then deposited into a drum roaster (TCHO mostly works with Barth roasters), and away you go. Like with coffee, the parameters for the roast are dependent on many factors, and each step in the roasting process will affect the flavor. You can start with one temperature and stay with that temperature for the entire roast, or you can adjust different variables during the roast to bring (or remove) a variety of characteristics such as acidity and roast notes.

Kintzer says that the size of a roaster can vary from 50 kilos to 5,000 kilos, and the length of the roast can range from 20 to 80 minutes. "Every batch is a little bit different," he says. "We source some of our cocoa beans from Peru, for example, specifically for their strong fruity characteristics. When processing these beans, I know that we will need to do a light micronizing, light nib crack and light roast to bring out those characteristics. Other origins and bean types will be processed completely differently, for example to develop more of a roasted, classic chocolatey profile." The Barth roaster system gives TCHO the flexibility to customize the process with drum speed, phases of heat application, and a sterilization step.

TASTING FORMS

No matter what product you taste, most tasters can agree that your thoughts and experiences should be recorded. I have spent a lot of time thinking about, arguing and justifying what a coffee form should be or has become. Tasting form discussions are almost always contentious, sometimes heated, and many times they contain deep emotional attachment. In fine cocoa, there are a variety of forms used, with some similarities, but no universally accepted format. Thus we set out to explore our options for creating a new cocoa form, and to do this, we started with coffee.

DEFINE WHAT YOU WANT

In specialty coffee we have a pretty slim definition that encompasses the basics but provides us with structure and a solid foundation for what you must find for a coffee to cross into the realm of specialty. Specialty coffee is commonly referred to as clean, sweet and uniform with exemplary characteristics like acidity, body and distinctive flavors. Over the years, I have found this to be a useful baseline for understanding coffee and communicating within the industry.

As the lead coffee instructor for the cross-sensory workshop, I started out with an explanation of the SCAA form and took the group through cuppings and sensory exercises over the course of two days. I hoped that these coffee exercises would help the group think more broadly about how a new cocoa form could be structured. What information could we extrapolate from coffee tasting and use in a fine cocoa form? After days of tasting coffee and doing various sensory exercises, we returned to cocoa. What were the attributes that were the most important to identify in tasting chocolate liquor? One of our goals was to have an agreed-upon definition within the group and to share it with the world. I also hoped that suggesting the idea of a universal definition for fine cocoa would help us pinpoint the necessary elements to define fine cocoa and guide us in our effort to create a new, dynamic tasting form.

Zara Saavedra, a national judge for APPCACAO, said that a new form is needed to "look for attributes, which stand out differently, with greater or lesser

intensity." The form the panel of judges had been using did not measure quality and intensity as we do in coffee. This was a new way of thinking. "We were looking for the best attributes in both and to identify defects," Saavedra says. Much like in cocoa, we in specialty coffee know it is important to identify exemplary character, but you also have to identify potential problems. Knowing how to identify defects is a

necessary skill as a taster—to provide feedback and identify solutions.

CALIBRATE—START WITH THE FUNDAMENTALS

In order to ensure that all 16 workshop participants were on the same page, we

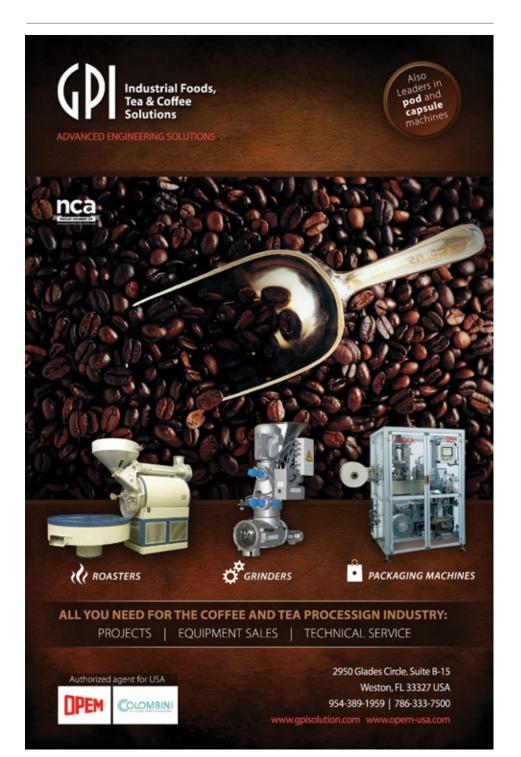
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completed a series of cross-sensory exercises to build aroma memory recall, expand our understanding of flavor and cover the fundamentals. In addition to cuppings, we used tools like Le Nez du Café, organic acids and reference tastings as a way to calibrate.

Tasting fruits, nuts, vegetables and beverages of different varieties offers tasters the opportunity to build aroma and taste memory recall, but also helps tasters to clearly identify the flavors that might be found in a particular product. Together, we went to the market to pick out possible products to taste—foods that we hoped would encompass flavors, textures, and aromas.

Cristina Liberati, the grants coordinator for the project and a primary trainer for the workshop, explains, "Cacao is so beautiful in its complexity of flavors and aromas, and it is important to always be expanding and refining a taster's 'encyclopedia of flavors' to draw from and properly identify the characteristics of a sample. So, for every sensory analysis training, we bring food items to origin that we use as descriptors—like cranberry for a tart fruitiness, or mushroom powder for a type of earthiness. We also go to the local market and try to link flavors we find in countries of origin to the flavors of their cacao—like a smoked meat that is related to a processing defect in cacao."

It comes down to being able to communicate effectively about the product. Saavedra agrees: "I think that standardization is very important since it allows [us] to speak in a certain way, to speak the same language."

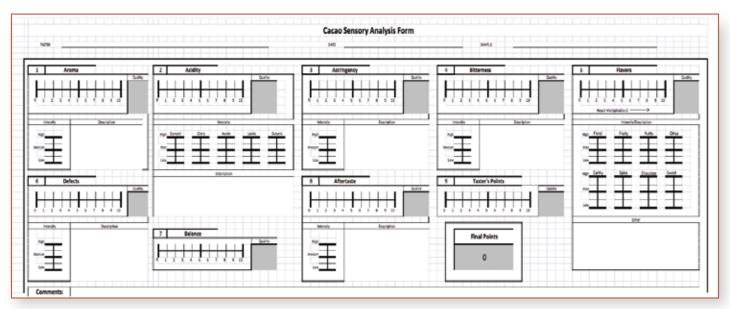


Sorting and evaluating cocoa beans in the cross-sensory workshop.

TASTING PROCESS

Cupping coffee is both similar and different from tasting chocolate liquor. For coffee, the process and methodology are well established. To cup coffee, it requires roasted coffee, cups, a grinder, a spoon, water and more. The ritual of coffee cupping is a 45- to 60-minute process (minus the roasting, setup and breakdown), and one can taste multiple samples during that period. Coffee professionals are meticulous with our setup and preparation, with temperature playing a central role





Round one of the cacao evaluation form, which is a work in progress. | courtesy of USAID Cooperative Development Grant program

in the whole process. We record our results in silence and provide an open space at the end of the cupping to discuss our findings.

In chocolate liquor tasting, you begin with a solid mass that looks like a chocolate bar, or a melted version that is just above body temperature. But in either form, it is pure cacao. Each sample is tasted blindly and individually, one at a time with a massive rush of flavors that take over your entire mouth. The experience is shocking and exciting with differentiated levels and types of acid, from acetic to butyric, astringency, bitterness, and aromatics such as fruity or nutty. It's an amazing sensory experience, but it's different from coffee. You taste one sample at a time and wait for the order in which the flavors appear, and then you swallow it or spit it out, just like coffee. It's a slower process than coffee and requires a bit of patience. Each sample is tasted over the course of 10 to 15 minutes. The explosion of flavors take over, and it is only possible to taste 1 to 4 samples in an hour. Chocolate liquor is half fats and half solids, and your palate is well coated with these substances at the end of the tasting. It's intense.

In tasting both coffee and cocoa, Martin Domínguez Vances says, "The experience for coffee is different from that of liquor; methodically, [coffee] already has an established procedure with clear steps and developed descriptions. Coffee evaluates intensity and quality at the same time. In cacao, it's only intensity. Coffee can numerically qualify with a procedure; in cacao, this hasn't been established. Coffee has more developed references for descriptors; cacao is not as developed."

THE RESULTS

After four days of workshops, tasting exercises and development, the group created an agreed-upon working definition for fine cocoa and established a new, advanced cocoa tasting form. The new form is more detailed, works on a system of 1 to 100 points, and incorporates the intensity of attributes like acidity with a qualitative score. We consolidated various flavor terms like "fruity," "nutty" and "citrusy"

into one "Flavor" category. This was a big move for the group. Many of the tasters had been tasting and scoring these attributes individually, and now they have it all on one form. It was an exciting process, and we were all pleasantly surprised by our work.

Sandro Aquino, general manager of Oro Verde, one of two cooperatives in the project that produce both coffee and cocoa, told me, "I am convinced that we should taste with a universal protocol that standardizes the criteria of evaluation and that will allow us to make comparisons in our assessments."

Contreras was happy with the results as well. "I think that it is a more complete format and allows us to think more about the sample that we are tasting in order to extract the complexity of the sample and translate it into the format," he says.

Over the past three months, participants have been working with the new form in their tasting laboratories, and it was presented to a panel of international judges this summer at the Peruvian Fine Cocoa competition. Our group will meet again later this year to continue our work to refine the fine cocoa tasting form.

Both coffee and cocoa are enormous industries with a variety of interesting projects and work in progress. We wanted to share our work with you as a way to help you think outside of the coffee world and to push our own thinking forward.

Contreras concludes, "In Peru, I think that we still have a long way to go in the world of fine cocoas. The most important thing at this time is to find the processes of fermentation and drying for each one of the types we have in Peru, to exploit all of its genetic potential and thus be able to deliver chocolate beans to make culinary wonders without violating the essence and character of good fine cocoa."



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