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RULING THE ROAST

Reflections on Roasting Fundamentals

by Willem J. Boot

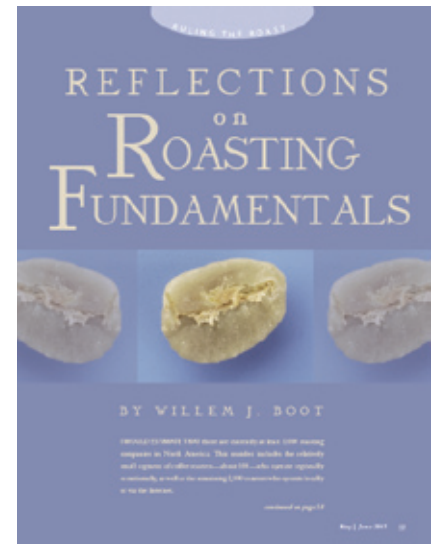
I WOULD ESTIMATE THAT there are currently at least 3,000 roasting companies in North America. This number includes the relatively small segment of coffee roasters—about 100—who operate regionally or nationally, as well as the remaining 2,900 roasters who operate locally or via the Internet.

Who could have imagined 10 years ago that the number of North American coffee roasting companies would increase more than tenfold? Amazingly, almost every week a new roasting company or roasting machine is added to our family of coffee aficionados, and we can expect this trend to continue.

With this ongoing expansion, I also see an increasing need for practical hands-on information about relevant coffee roasting issues. In this article, I have summarized a few ideas and opinions about the craft of roasting that I've learned along the way. This article only touches on a few of the myriad things that need to be learned on the way to becoming a specialty coffee roaster, but this information offers a good starting point, and will perhaps save new and growing roasters from having to learn via the ever-popular “trial and error” method.

ONE Machine Selection: Try Before You Buy

There are more than a handful of reliable manufacturers of roasting machines, and it



can be difficult to know where to begin. When shopping for a new machine, all manufacturers will claim that their product offers the ideal answer to all your coffee desires. And, indeed, manufacturers generally know their stuff. A good manufacturer will know the exact ins and outs of their specific machine. This makes sense, as most roasting machines are assembled 100 percent manually, making the construction of roasters a labor of love by itself.

However, I can testify that while most manufacturers are excellent technicians and engineers, few are coffee roasters by trade. This is part of the reason that it's oh-so-important that you “try before you buy.” Remember, the roasting machine might be the most important asset of your emerging coffee emporium.

By test roasting with the prospective machine, using your own trusted green coffee beans, you, the roaster, can develop a perfect feel for the handling and operation of the machine. Most importantly, this offers the opportunity to taste the flavor of your coffee beans on each of the machines and decide which one works best for your particular beans.

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In general, the roasting machine should at least have the following gadgets, which will also enable you to execute some of the protocols that are described later in this article:

* Digital bean temperature probe, which accurately measures the temperature of the beans being roasted. Remember, the probe only provides an indication of the bean temperature, since it is impossible to display the true internal bean temperature.

* Digital or analog environmental temperature probe, which displays the temperature conditions inside the drum. The read-out of this probe generally reacts immediately on changes in the BTU output of the burners.

* Analog gas pressure gauge, placed between the gas throttle and the burners. As a result, this gauge will provide a true indication of the BTU output of the burners.

TWO Roasting Profiles: Roast Flavor Versus Bean Characteristics

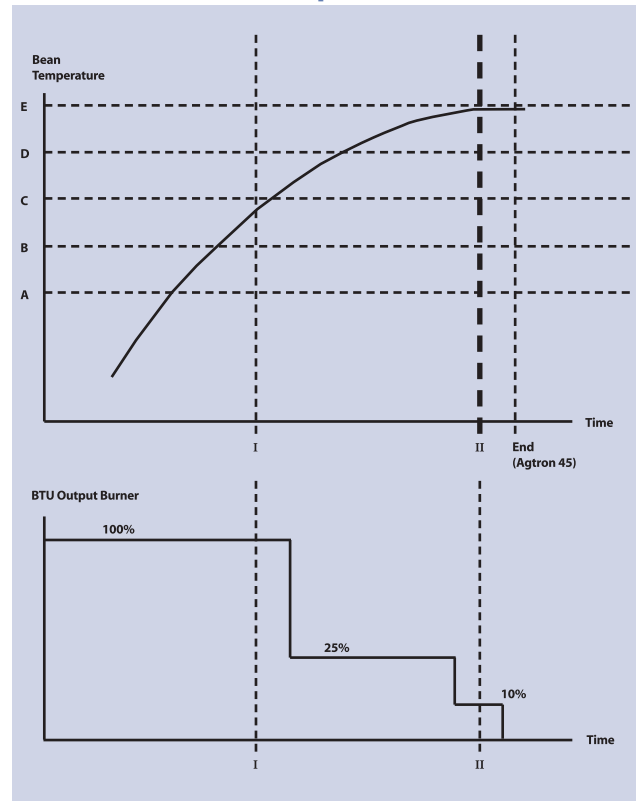
The fundamental objective of roasting should be to reveal the best possible flavor profile of the bean while developing a balance between roast flavor and bean characteristics. The roast flavor develops as a result of the caramelization of sugars, while the bean flavor represents the *terroir* of the coffee. (Terroir, a French term, literally means “soil” and as a concept, it is mainly used in the wine industry, but can also reflect all the relevant parameters that determine coffee quality: coffee variety, microclimates, processing practices and soil conditions.)

Some roasting companies apply fundamental beliefs to their roasting practice and insist on roasting light enough to reveal the characteristics of the beans only, without developing any of the bittersweet flavors that generally go hand in hand with darker roasting styles.

In general, the best choice for choosing roasting profiles is the path of taste differentiation. For that reason, it is wise to offer coffee varieties in various roast profiles so that your customers can decide. The following two graphs are provided to illustrate possible strategies.

Graph A shows a roasting curve for a Kenya AA, roasted to a degree of Agtron 45 (M-basic standard). Most coffee in Kenya is grown higher than 5,500 feet, which can have a tremendous influence on the density of the beans. Picture A. shows an example of Kenyan coffee; look at the center cut which seems to be floating on the outside of the bean. Now look at Graph A again; notice the steep slope of the bean temperature curve throughout the roast, which is a roasting profile that generally only can be used for the hardest coffee beans. The events during the roasting process are

Graph A



Picture A. Kenyan Bean

described in Table A on page 61.

Now look at Graph A and the diagram below the roasting curve, which displays the BTU output of the burner. To establish the steep roasting curve, the operator in this scenario keeps the gas throttle 100 percent open until the first crack is in full swing. Towards the end of the first crack, the flame is reduced to 25 percent energy output. Despite this sharp reduction in energy supply, the beans have developed sufficient internal, endothermic heat to facilitate the steep roasting curve. At the beginning of the second crack, the gas is reduced to 10 percent and the roast comes to an end. This example illustrates how we can develop a

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steep roasting curve with very dense coffee beans, without over-roasting or burning the product.

Graph B shows a roasting curve for the same Kenya AA coffee, roasted to a much lighter degree of Agtron 56. Many coffee professionals believe that it is impossible to create a palatable product with this light roast degree, and I firmly disagree! The trick is in the speed of the process; if roasting is done slowly enough, allowing enough time between the first crack and the end of the roast, then I guarantee you that there is true balance between roast flavor and bean characteristics. The objective in this case is to effectively slow down the roasting process right at the start of the first crack, which is shown in the lower section of Graph B. The operator anticipates the first crack by reducing the energy supply of the burners at least 15 seconds before the first crack starts. As a result, there are at least three minutes between the start of the first crack and the end of the roast, which comes at an Agtron bean color of 56 (M-basic standard). One word of caution: always prevent the coffee from baking, which would occur if the bean temperature stalls or decreases. Provided that you selected an exemplary Kenya bean, the resulting flavor is very balanced and rich in citrus fruit flavors with a refreshing aftertaste, resembling a well-ripened sweet tangerine.

THREE Roasting Profiles: Don't Be A Copycat

New companies that are just about to inaugurate their roasting machine should always devote sufficient time and energy to product development and market testing. Unfortunately, few companies invest ample resources in the important protocol of testing coffee products and recipes. Instead, they end up copying the roasting profiles of established roasting companies.

With the huge number of specialty roasters in North America, one should expect diversity in roasting recipes and flavors. Wouldn't it be great if the consumer had abundant choice between various degrees of roast, from light—for the supporters of bright acidity and refreshing flavors—to medium-dark to the usual darker roast colors?

With the ongoing level of organization, Roasters Guild members should be taught the tricks and techniques of lightening their roasts, so that the community can truly and successfully differentiate itself from the typical dark roast color of Big Brother "S."

Being unique means additional work, including going back to the drawing board and redeveloping some of the concepts

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Graph B

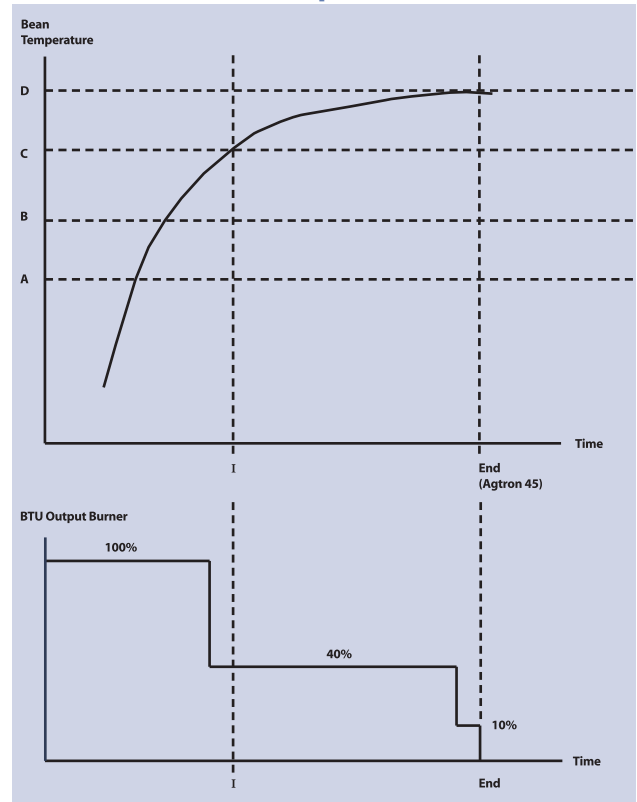


TABLE A. COFFEE ROASTING EVENTS

REFERENCE POINT	EVENT	DESCRIPTION
A	Beans are releasing free moisture	Bean color rapidly changes from yellow to light brown
B	Free moisture is evaporated	Bean color is cinnamon brown; some coffee aroma becomes noticeable
C	First crack starts	The bean expands and breaks at the center cut, which causes the first "pop"
D	Ongoing bean development	Caramelization of sugars causes major developments in flavor. Color changes from light to darker brown
E	Second crack starts	Carbon dioxide (CO ₂) builds up within the cell structure of the beans and causes cell walls to snap, thus the second "pop"
I	First crack	
II	Second crack	

that were adopted before, but in most cases, this additional work is well worth the effort. In general, it works well to include a group of loyal customers in a process of re-engineering your roast profiles and don't forget the next important step: educating your customer base about the benefits of your newly developed roasting styles.

Now, let's come to the million-dollar question: Why would you go through all this hassle of differentiating your company and products from the others? Let me answer with a short anecdote. Recently, I assisted a client with the creation of special roasting profiles for a potential customer who operates more than 10 coffeeshouses at the local university campus. At least nine roasting companies were invited to bid on this mega-account by sending in samples of their roasted coffee products. Beforehand, we surveyed the roast degrees of some of the local and regional

specialty roasters, and we found that the roast levels were all darker than Agtron 40. So we decided to differentiate our bid by developing some roasting profiles with a lighter roast degree but with enough complexity in the flavor of the product. We won the bid! The moral of the story: don't be a copycat and dare to be different with your roasting profiles.



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