

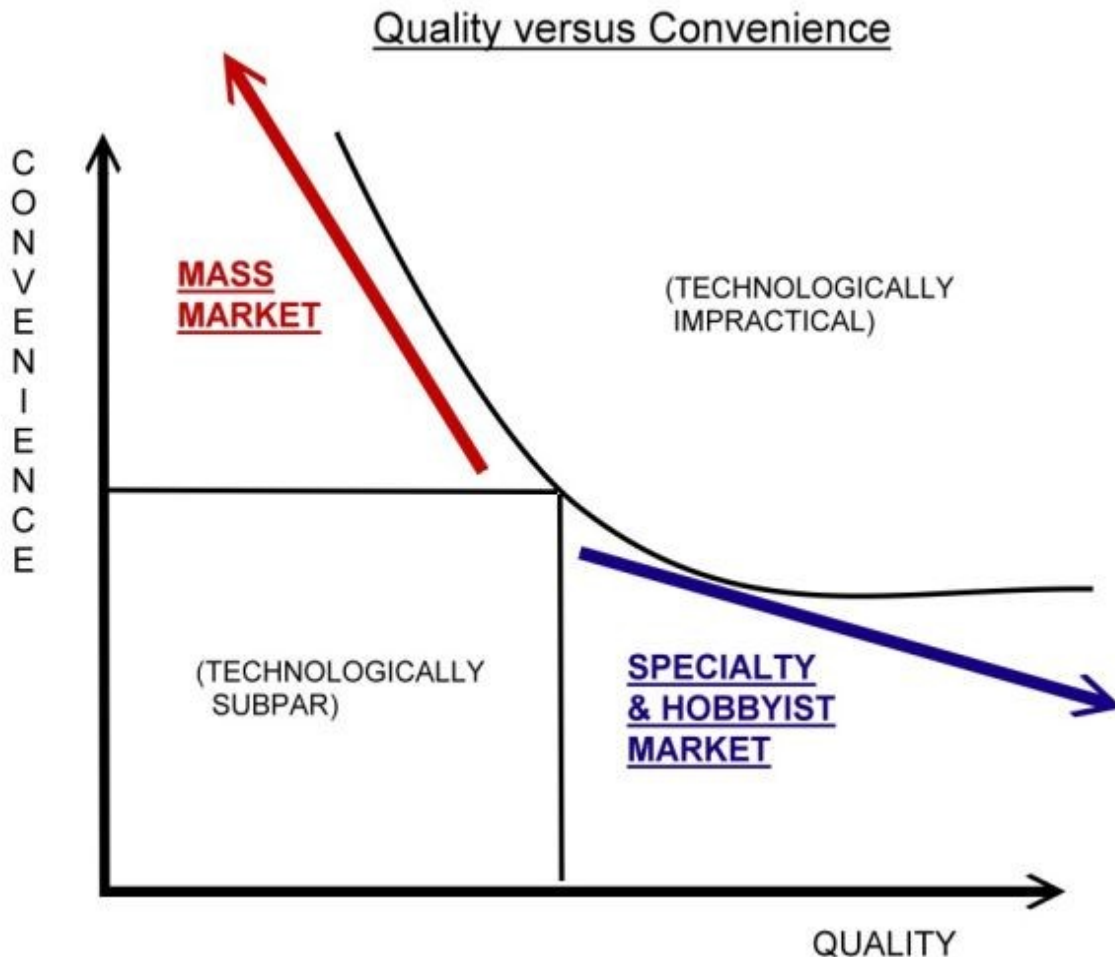
VALUE SUBTRACTED ESPRESSO

- Why it's better
- How to make it

By Jim Schulman

SUMMARY The coffee market is dividing into a mass market looking for ever more convenient, but nevertheless acceptable, tasting coffee and espresso; and an enthusiast market that prepares the world best coffees in ways that do them justice, regardless of how inconvenient the process. This paper outlines the inconvenient and “value subtracted” process of making enthusiast espresso; it is the author’s written version of a presentation he gave at CoffeeCon 2012.

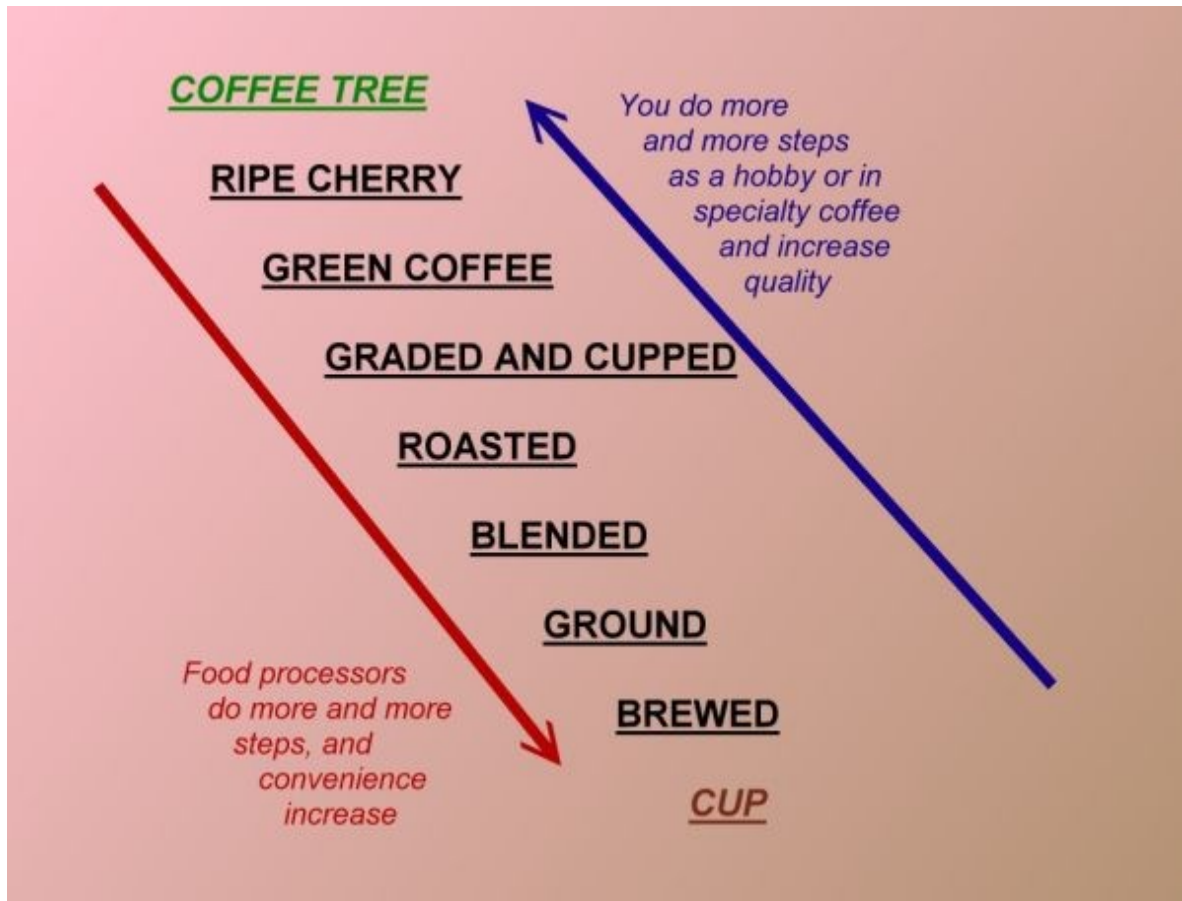
THE ENTHUSIAST COFFEE MARKET



Once you hit the boundary of technological possibilities, you have to trade off quality to get more convenience, and convenience to get more quality. In the past, for most products, a single market formed, where these tradeoffs formed a single continuum. With the emergence of internet, small groups, spread thinly over the globe could form communities and exchange ideas. This has led to the formation of new enthusiast markets for many products, which have split off from the mainstream mass production markets in search of ever higher quality. While these high end craft markets already existed as the province of the wealthy, they are now dominated by people with normal incomes who pick and choose to do a few cherished things in their lives at the highest level of quality.

The most enthusiastic and knowledgeable customers of the best specialty coffee roasters and cafes have chosen to this with coffee.

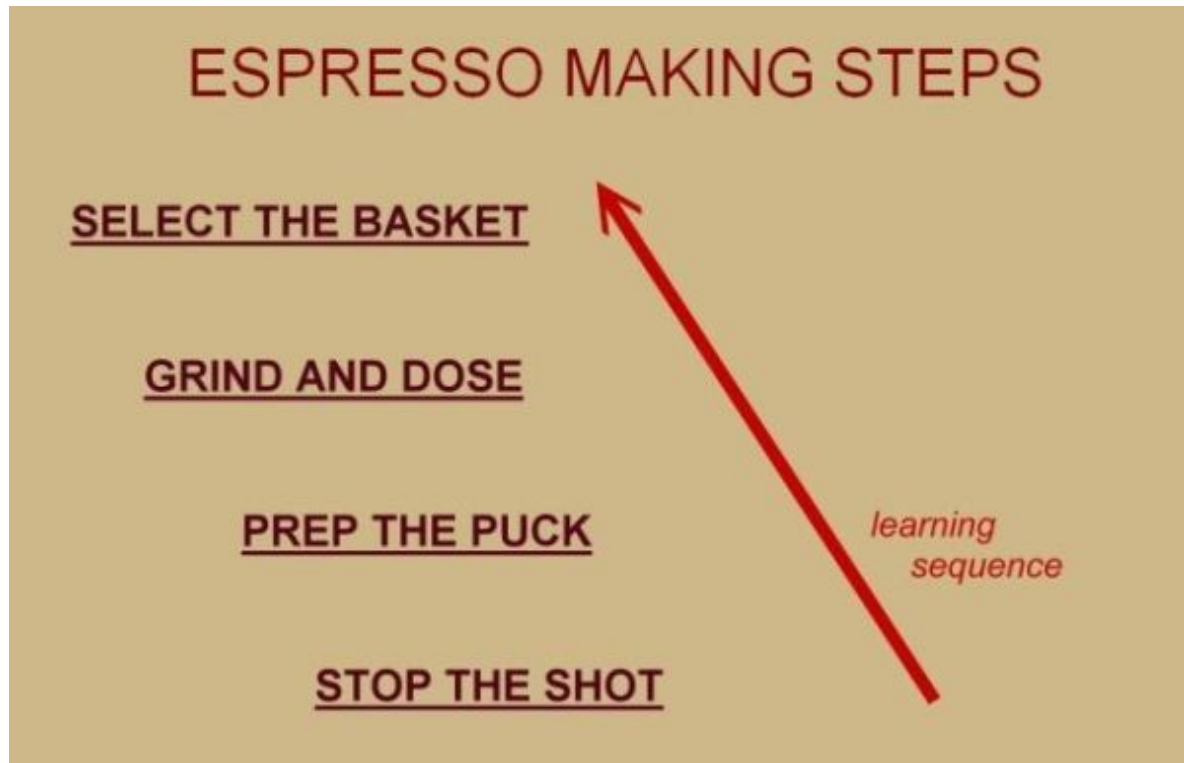
IF CONVENIENCE IS VALUE ADDED; THEN QUALITY IS VALUE SUBTRACTED



Coffee goes through many steps from tree to cup. In order to add convenience, coffee companies do more and more of these steps for you. In the past, this meant either instant or preground coffee with quite poor quality results. Now it means either superautomatic machines or capsule machines where the coffee is ground, portioned, placed in a brew chamber and cleanly disposed. Because of the enhanced control and better packaging technologies, these new convenience forms achieve a far more acceptable quality level than the old ones.

But this acceptable quality is achieved at the cost of treating the actual coffee like a commodity. Everything that makes one coffee different or better than another is erased and homogenized into a raw material for capsules. The opposite of this “added value,” is to subtract value by doing as much as possible for yourself, and making sure the rest of the steps are done by coffee people as dedicated as you are. In this way, you return to the coffee itself, with all its complexity and diversity.

MAKING VALUE SUBTRACTED ESPRESSO SHOTS



Suppose you have a good espresso machine and grinder. You are now set to buy coffee from the best cafes and roasters in the world and do them justice by making great shots. To do this, you have to select the right basket, grind and dose correctly, skillfully prepare the puck, and after starting the shot, know when its done and stop it at the right point. The learning sequence for doing this is backwards, subtracting value step by step, since the major taste flaws in a badly made shot will come from the last thing you did wrong.

JUDGING ESPRESSO SHOTS

How can amateurs like us know when the shot is well made?

Option 1: Invite over George Howell and Geoff Watts to taste it and describe the shot's complex flavors.

Option 2: Learn to rate the shot's simple taste properties.

-- Concentration

-- Taste Balance

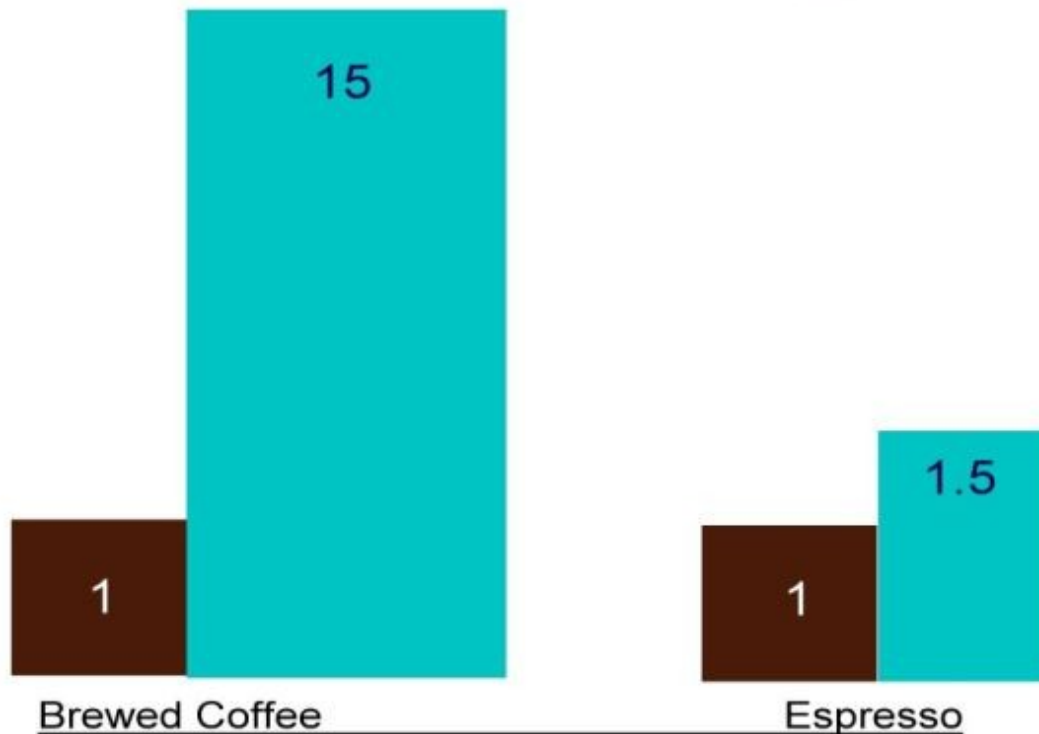
-- Mouth Feel

Appreciating the finer points of a coffee takes long practice, and the deepening of ones appreciation is the reward for pursuing the hobby for a long time. But this opens up a dilemma: how can newcomers know when they have brewed a great cup of coffee or made a great shot of espresso, a cup or shot the best expresses that coffee's nature?

First off, you need to trust your taste -- a great shot will taste good, even to beginning enthusiast -- you wouldn't be an enthusiast if you weren't moved by the taste of good coffee. Second, while sensing the nuances takes times, you can very quickly learn to judge the basics: the concentration, taste balance and mouth feel of the shot.

CONCENTRATION: FINDING THE EDGE

Concentration is Coffee to Water Ratio, **not** Strength



geeky part → Stopping the shot when the pour gets light achieves the best concentration

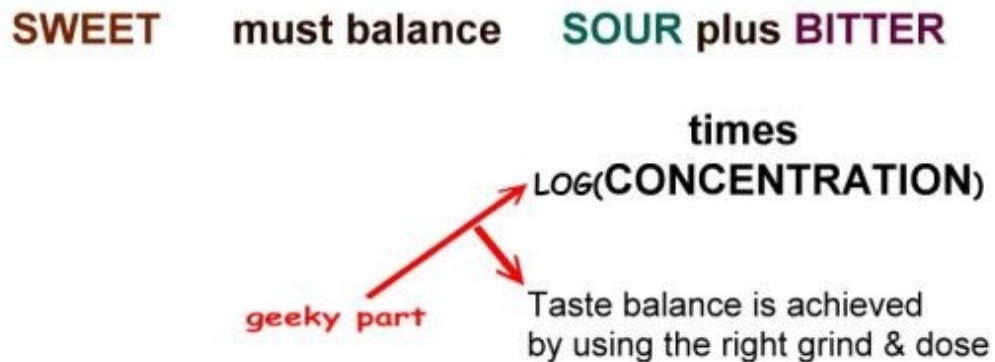
A shot of espresso is about ten times as concentrated as brewed coffee. The idea of this is to take coffee to the edge, so that every flavor is at its most powerful and clear, but not over the edge so that the flavors distort and the drinking of the shot becomes more of an ordeal than a pleasure.

This is important idea. If you think of the coffee as a musical score, brewing it is like performing it as chamber music, while making it as an espresso is like performing it with a full symphony orchestra. A soloist or quartet can be more nimble and refined; but when a symphony orchestra gets it right, the heavens open. So it is with the perfect espresso.

Stopping the shot at the right time is what achieves this perfect concentration

TASTE BALANCE: FINDING THE SWEET

WHAT IS TASTE BALANCE?



Coffee has roughly a thousand different aromas and flavors, any of which can appear in a shot of espresso. But there are only three basic tastes: bitter, sour, and sweet. The complex flavors and aromas are associated with the bitter and sour tastes; but a coffee will only taste pleasing if its sweetness balances its bitters and sours. Moreover, the more concentrated the brew, the more sweetness is required to balance the bitters and sours.

The limit on sweetness is determined by the ripeness of the coffee; but the right balance between it and the other flavors is determined by the choice of grind and dose.

MOUTHFEEL: FINDING THE SMOOTH

MOUTHFEEL:

Pressure extraction emulsifies oils and traps carbon dioxide in a foam called **CREMA**.

TOO MUCH CREMA: tastes dry and bitter

TOO LITTLE CREMA: and there's an oil-slick on top of the shot.

JUST RIGHT CREMA: tastes rich and creamy

geeky part → **For a given grouphead**: the amount of coffee used is proportional to the crema. So choosing the right basket is about getting the right mouthfeel.

The pressure used when extracting espresso emulsifies the fat and water, which then traps the CO₂ in a foam called crema. This is a very complex and imperfectly understood process, but it seems that the extent to which this happens on a given machine depends on the amount of coffee used; larger amounts of coffee create proportionally more crema.

The right amount of crema creates a creamy mouthfeel which, unlike added cream, enhances rather than masks the flavors. If the crema is overabundant, it can taste dry and astringent, and thus interfere with the flavors. If the crema is too little, the flavors are unaffected, but the mouthfeel is watery.

For a given basket, the right taste balance dictates the dose; so manipulating the crema by changing the amount of coffee requires that one choose the right basket from among the available alternatives.

STOPPING THE SHOT:

FIRST YOU SEE: 5 SECONDS OF NOTHING (DWELL TIME)

THEN YOU SEE: A SLOW DARK, NEAR DRIP OF A FLOW

THEN YOU SEE: A RICH BROWN CHOCOLATE SYRUP FLOW

THEN YOU SEE: THE FLOW GETTING LIGHTER AND FASTER

FINALLY YOU SEE: A GUSH

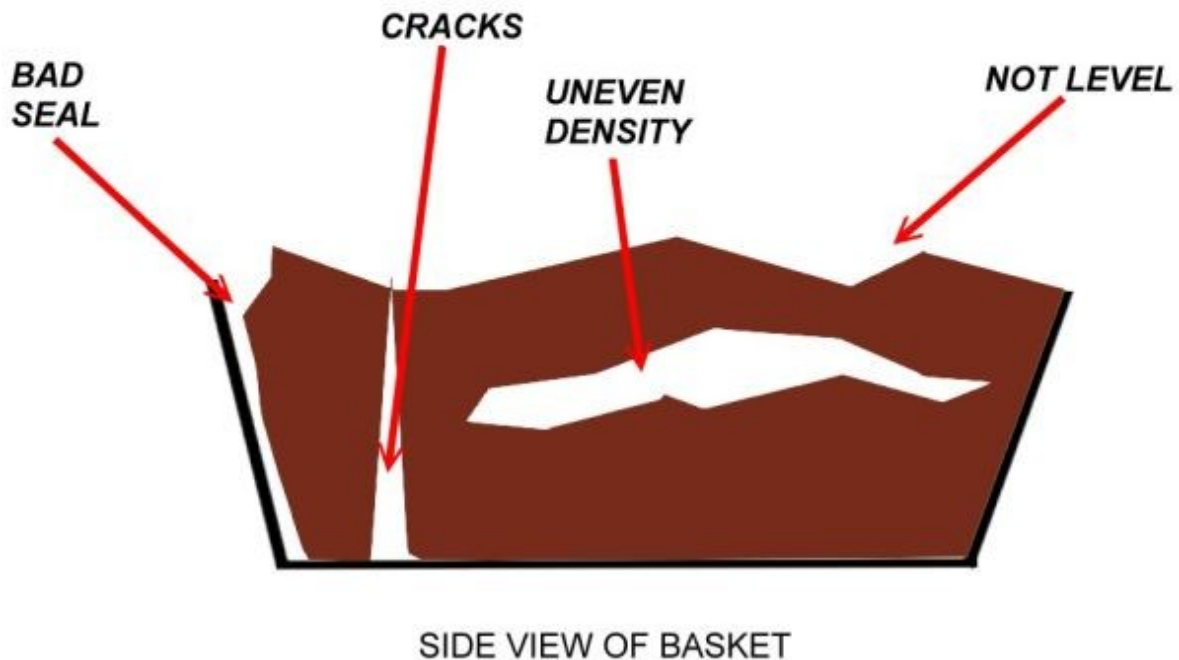
***STOP THE SHOT AS IT GETS LIGHTER,
CALLED BLONDING, AND BEFORE IT
GUSHES. THIS WILL ACHIEVE THE BEST
CONCENTRATION.***

Automatic machines will stop a shot when a certain amount of water has passed through the puck; but how does it know which amount is right? It doesn't. For some coffees, the espresso is perfectly glorious when twice as much water as coffee is used; for other coffees, it is more like one part water to one part coffee. While the final test is always the taste; it is possible to get very close to the right concentration by stopping the shot by the appearance of the flow.

When most of the available solids have extracted from the puck, the flow will get lighter and faster. If you stop the shot at this point you have taken it to its maximum concentration compatible with proper extraction. You can run more water; but then you are taking it away from the edge, muting its flavors without adding anything positive to the balance of the shot.

PREPARING THE PUCK, PART 1

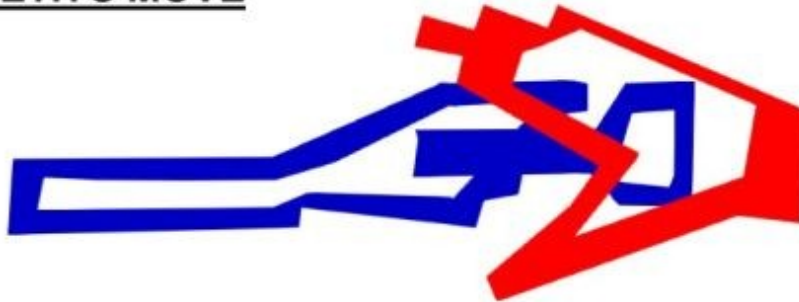
FAULTS IN PUCKS



Espresso is made from water percolating through a bed of coffee at intense pressure. This bed of coffee is called the puck. If the puck has cracks, if it does not seal to the basket, if it is uneven in level or density, the water will not flow through it evenly, and the shot will be compromised. There are several techniques for successfully preparing the puck.

PREPARING THE PUCK, PART 2

STOCKFLETH'S MOVE



1: Hands at your chest, elbows out. PF in left. Fat part of right palm down on the basket and coffee.

2: Push your hands out and elbows in. The rotation of your palm on the coffee will level and seal the puck.



Stockfleth's move is named after the Oslo cafe where it was invented. It is primarily used by professional baristas, since it is fast enough to be used in a cafe, but requires a good deal of practice to get right.

PREPARING THE PUCK, PART 3

WDT (Weiss Distribution Technique):

Rapidly poke and stir the coffee with a long pin to get out all the bubbles and unevenness, and to settle the grounds

TAMPER NUTATION

Roll the tamper around its edge over the ground coffee in the basket, like a tossed coin settling, to level and settle the grinds.



The Weiss Distribution Technique is the slowest but most thorough way of preparing the puck. It is recommended for beginners who are struggling with all the aspects of making espresso, since it will always work. Getting the shots right is the first priority; developing speed and grace is secondary.

Tamper nutation is a simpler technique than Stockfleth's; but works best when the basket is removed from the portafilter and lying on a flat surface. If you use this technique, a convex tamper that fits loosely in the basket is recommended.

PREPARING THE PUCK, PART 4

Learn how to level and seal the puck by using a **NAKED PORTAFILTER** (a portafilter with the bottom cut off)

This allows you to see exactly how the shot is going.



shot by
Tonx

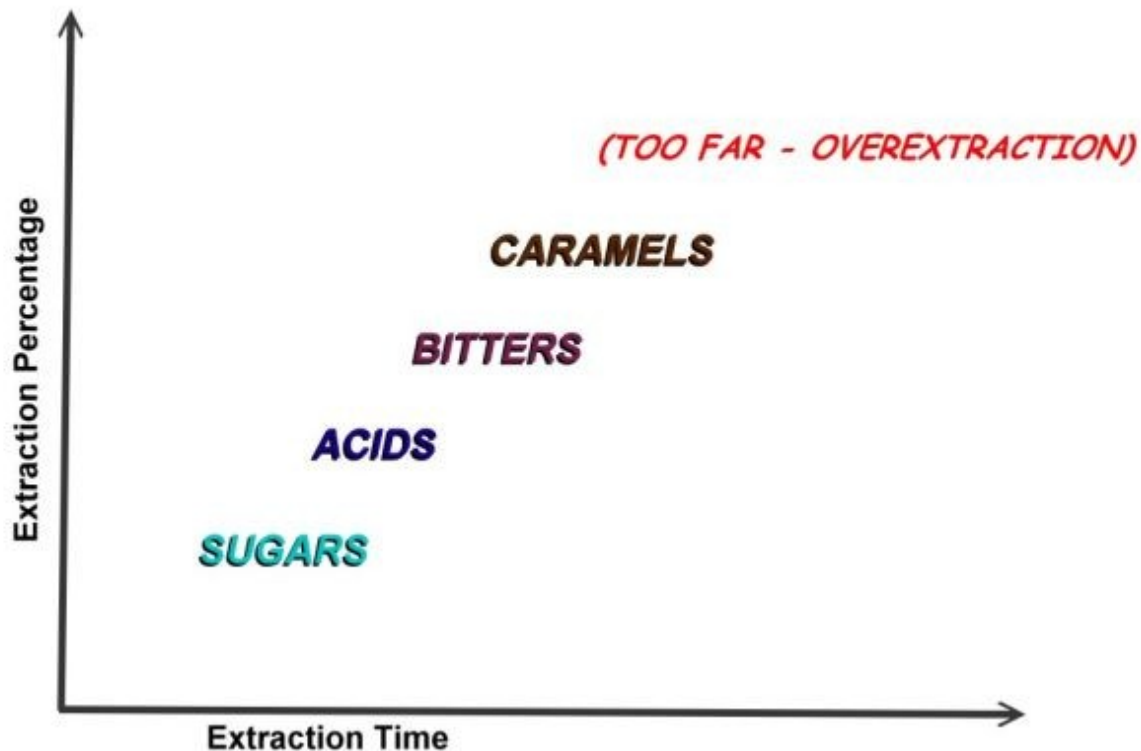
A naked portafilter has no spouts or base, instead the base of the basket, with all its holes, is exposed. This allows the espresso pour to be seen. There is no better or faster way to learn how to prepare a puck than by using a naked portafilter.

If the puck is sound and the pour is good, the coffee will extrude evenly from all the holes and gather into a stream in the center, as illustrated. If the puck is unsound, coffee will squirt off the base in all directions, and the single stream will fail to form. Since the feedback is immediate, it will let you know how effective your corrections to preparing the puck have been.

It is not necessary to use the naked PF all the time; but it is a good idea to use it for a few shots every few weeks. This prevents one from picking up bad habits.

SETTING GRIND AND DOSE, PART 1

How Different Tastes Extract



When coffee is exposed to hot water, the compounds carrying the flavors dissolve at different rates roughly proportional to their molecular weight, with the lighter compounds dissolving faster. The fastest dissolving are the simple sugars, glucose and fructose. After this come the acidic compounds that are in the bean at the outset, and then the bitter tasting compounds that form in the middle roast's Maillard's reactions. Finally the caramels which form late in the roast, i.e. the longer chain sugars, dissolve.

The simple sugars can sometimes balance the bitters and sours in brewed coffee, but in espresso, one also needs to extract the caramels. So while a measure of underextraction can sometimes work for brewed coffee, it almost never works for espresso.

Overextraction is when insoluble compounds are broken into smaller pieces by the action of acid, heat and pressure. these compounds taste vile, like instant or boiled coffee. This can only happen in overly long, overly fine ground shots, on poorly calibrated machines

SETTING GRIND AND DOSE, PART 2

GRIND AND EXTRACTION

COARSE GRINDS: Less surface area, more volume,
means slower extraction.



FINE GRINDS: More surface area, less volume,
means faster extraction



The rate and extent to which coffee extracts is determined by the amount that is in contact with the water. As the grind is made finer, the particles of coffee get smaller. This means there is more surface area exposed to water for a given weight of coffee. Therefore, finely ground coffee extracts more quickly and more thoroughly than coarsely ground coffee.

The biggest mistake made by even expert baristas is adjusting the grind too frequently. It would never occur to anyone to adjust the grind on cupping or brewing grinders, since they have been calibrated to achieve the correct extraction. So why should it be different for espresso?

SETTING GRIND AND DOSE PART 3

Grind Size and Flow Rate

Coarse Grinds pack loosely, and require higher doses to maintain the same flow



Fine grinds pack tightly, and require lower doses to maintain the same flow



The reason even experienced baristas make this error is that the flow is also affected by grind size. A finer grind packs more tightly and blocks the flow more effectively. Therefore, many baristas have gotten into the habit of correcting too fast or too slow flow rates by changing the grind setting.

This is a mistake based on being trained to dose at the same amount all the time. Once the grind is set for the correct extraction, it is better to adjust the dose to compensate for changing flow conditions.

SETTING GRIND AND DOSE, PART 4

Putting Grind, Dose, Extraction, & Taste Together

- 1. Coarser Grind means**
 - lower extraction**
 - higher dose**
 - taste balanced towards acids and bitters**

- 2. Finer Grind means**
 - higher extraction**
 - lower dose**
 - taste balanced towards sweet**

- 3. Use the same range of Grind for all baskets and machines**
 - the extraction is an absolute, determined by grind size**
 - change the dose, so the same grind range works.**

The proper approach to dose and grind is to fine tune the grind setting first, getting to the taste balance that is desired. At this point adjust the dose to get the right flow.

Obviously, before you do this, you need to have a properly flowing shot that acts as a benchmark. If that shot is too sweet, you can both coarsen the grind and up the dose to maintain the same flow and get a more emphatic shot. If the shot is too emphatic, simultaneously making the grind finer and the dose lower will do the trick. With time, you will know your grinder well enough to know how much of a dose adjustment any given grind adjustment requires to maintain a properly flowing shot.

Finally, since grind alone (once the shot flows properly) determines the taste balance, use the same grind range for all baskets and all espresso machines.

Basket Choice

Use your par basket, and get the stopping point, grind and dose right.

**-- If the mouthfeel is watery,
use a larger basket, same grind, higher dose**

**-- If the mouthfeel is dry.
use a smaller basket, same grind, lower dose**



The first choice you face when making a shot of espresso from a given coffee is which basket to use. For commercial machines, you will have a choice of smaller and larger singles, smaller and larger doubles, and triples. However, you can only make this choice well after all the subsequent choices have been made.

You start with your par basket, the one you usually use. Once you get the grind right for the proper taste balance, and the dose for the proper flow, think about the mouthfeel. If it is too watery, go to a larger basket and use more coffee. If it is too dry, go to a smaller basket and use less coffee.

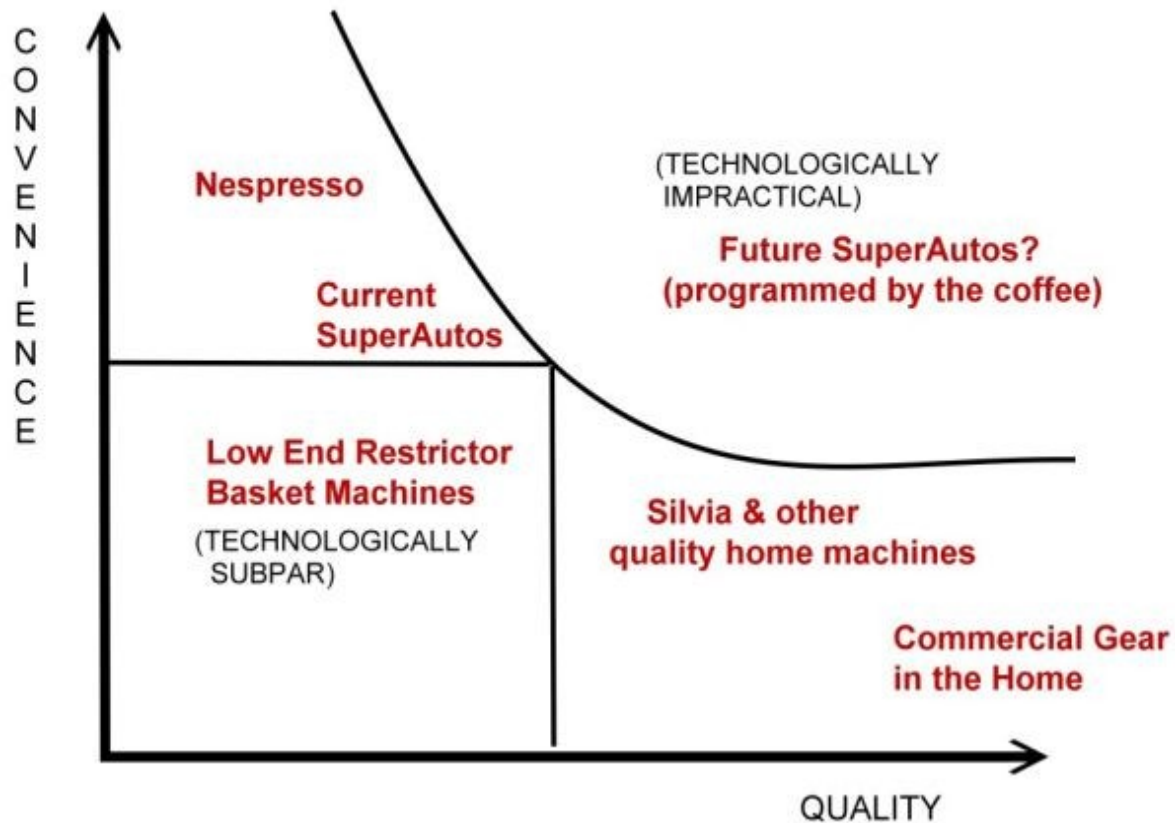
This ends the lesson on how to make value subtracted espresso

CHOOSING THE RIGHT EQUIPMENT

If you look back on these instructions, you see you need a grinder that can be adjusted very precisely, and a machine that responds linearly and gracefully to changes in dose and grind. This will not be the case with inexpensive machines or grinders -- such items are aimed at the mass market, not the hobbyist one.

EQUIPMENT CHOICE

Classifying Some Espresso Machines



The hobbyist entry level for grinders and machines changes over time. Currently the Baratza Vario is the minimum grinder that can accomplish the things in this paper; and the Rancilio Silvia is the minimal machine. Fully commercial grinders and semi-commercial or catering machines offer more scope at higher prices.