

## PEELING THE ONION OF TASTE

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*"Everyone eats and drinks, but few appreciate taste." Confucius*

If you were asked to describe what "taste" means, what would you say? I am using the word "taste" (singular) for the complete experience of smelling and tasting; some call this "flavor." Would you reply that it indicates whether something – a food, wine or anything you ingest – is sweet, spicy, salty, sharp, spicy, hot, cold, bland or intense? Would you think of anything else that would be mentioned such as fruity, herbaceous, perfumed or smoky? Or, when you encounter a new taste, would you say that it reminds you of the meat loaf your mother made or the soft ice cream you ate during summer vacations at the shore? Or, does it take you back to the smells in your home at Christmas – or any other holiday your family observed - when you were a child? Marcel Proust captured this notion when he wrote that "the smell and taste of things remain poised for a long time, like souls, ready to remind us..." Our unique experiences in life set the conditions for a "false" judgment when we encounter a certain taste, something scientists call perceptual bias. "Taste" is a comprehensive term we apply to food and drink, and one we take for granted; for most adults, it is instinctive, ingrained and usually matter-of-fact. Children, on the other hand, are still a *tabula rasa*, and they notice everything new and noteworthy, particularly tastes (even if their vocabulary is too limited to articulate their sensations), until they gradually

develop their own identities. As we enter adulthood, we have established marked preferences and dislikes in terms of basic tastes. Our upbringing also conditions us to be either open or closed to new tastes as adults.

### **Individual variations**

Taste is, in fact, a fascinating and highly complex subject. Taste is subjective, and varies by individual. (Yet, it can be argued that there are objective aspects of taste, which we will discuss later.) Research shows that, while we share most taste receptor genes, a certain number differ from one person to the next. Like other aspects of human behavior, in other words, taste is governed partly by our genetic heritage. We are not equally sensitive: we do not possess identical thresholds of perception and recognition. Some may *perceive* a distinctive aroma in a kitchen, for example, but do not know what it is, while others *recognize* that aroma as fresh basil just added to a tomato sauce. Some individuals are unable to smell a compound which can be detected by most others, a condition known as specific anosmia. Or, some may suffer from ageusia and go through life not noticing tastes (what a horrible thought!).

A well-known study conducted by Linda Bartoshuk of Yale University discovered that half of the US population might be considered average or "medium-tasters" while the other half is divided equally into "super-tasters" and "non-tasters." More women than men, according to this psychophysics research, are "super-tasters" (35% and 15%, respectively). Taste is also cultural, derived from the habits, norms and cuisine of the culture in which we were raised. Whether we like salty or bitter tastes is not simply an individual matter but may be the result of acculturation. Many people have not

realized how significant cultural influences can be. At a dinner party a few years ago at Dalla Valle, a cult winery in Napa Valley, a fellow guest was offended when I suggested that the appeal of wines that are powerful, bursting with fruit and almost sweet, due to high alcohol, could possibly be explained by an American diet of barbecue, Coca Cola, Miracle Whip and ketchup. I was simply making an observation, not a judgment, with respect to how upbringing can determine taste preferences.

### **Dynamic & experiential aspects**

Mood, health and setting can affect how we perceive tastes. If depressed and self-absorbed, we may not pay attention to food and drink. Our normal sensitivities are diminished or altered when we are sick. A wine tasted at a fancy restaurant on a special occasion may not be quite as exciting when consumed at home under familiar conditions. I cannot tell you how many times I have been told that the wine enjoyed during a memorable trip to Provence or Tuscany simply does not taste as good on this side of the Atlantic! Unaware of the experiential aspect of taste – and how powerful it can be in shaping our taste memory – everyone seems convinced that the wine “did not travel well.”

Taste is dynamic, changing with age – ours, as well as the wine’s. I know that my own perceptions have evolved in all matters of taste. I am more experienced at this stage of my life, and I have a large mental file of tastes, but I doubt that my taste faculties are as sensitive as they were, say, twenty years ago (except for hot peppers!). Our perceptions may not be as acute as we grow older, and our tastes may even take

unexpected turns later in life (in our 80's or 90's) in comparison with earlier adult years. You may now be thinking whether this applies to you, your parents or grandparents.

We should really think of taste as the sum total of sensations from visual, aromatic, taste and even sound cues. This is still incomplete, however, because taste is shaped as well by our *response*: taste is not dependent solely on external stimuli, but on our interaction with food and drink. For example, saliva, which again varies by individual, can dilute and interact chemically with substances in our mouth. Yet most people are completely unaware that their own chemistry may be altering the tastes they perceive.

### **Seeing is believing**

Appearance, studies have shown, can play a significant role in our response. Chefs realized a long time ago that an artfully arranged plate with small portions of contrasting ingredients with striking colors can heighten anticipation and therefore favorably "prejudice" our reaction – even if the taste does not fulfill the visual promise. The same ingredients, prepared identically, but displayed on the plate in a manner we find less attractive may not taste as good. Conversely, this same plate could appear fussy and overdone to someone who really wants a simple plate of pasta. In other words, the visual message is quite persuasive by itself, and may in fact significantly influence the degree to which we enjoy the food. Visual cues, in short, may be more powerful than other sensory input under certain circumstances.

In wine, appearance is usually not as influential for most people. However, professional tasters know that it communicates significant information about the

condition and state of maturity of a wine – and, in some cases, much more. For the same reason, it can prejudice sensory analysis. A pale red wine tends to be less concentrated with flavor compounds than one that is dark and opaque since the red pigment (anthocyanin) is part of the polyphenolic content that contributes to taste. This can be misleading, however, as there are exceptions, notably wines based on Pinot Noir and Nebbiolo, which can appear comparatively light in color and still have an intense aromas and tastes. If we see a bright color dominated by red and purple, we know that the wine is still youthful. A white wine that has darkened and has taken on a brownish tint is aging, as is a red wine that seems to be losing color and is tawny at the rim. In a sparkling wine, the fine stream of very small bubbles of a top flight vintage Champagne is not only aesthetically pleasing, but also reveals a long, slow secondary fermentation in a cold cellar. Large “vulgar” bubbles that rise quickly to the surface like club soda indicate a simple tank-fermented sparkler. Cloudiness in a wine could result from lack of filtration prior to bottling – considered by some critics and winemakers as injurious to a wine’s intrinsic quality – but is usually the dislodged sediment of an older vintage that will resettle if the bottle is left upright for a day or two. Or, a cloudy haze could be a symptom of microbial spoilage. There is, potentially, much to be learned from a visual inspection.

### **Aroma is the driving force of taste**

Next we come to aroma, without doubt a fundamental albeit usually underestimated component of taste. Indeed, taste without aroma is virtually meaningless – a lackluster, hollow experience. The legendary chef, Brillat-Savarin, was

insightful when he wrote that “I am tempted to believe smell and taste are in fact but a single composite sense, whose laboratory is the mouth and its chimney the nose.” (*The Physiology of Taste*, 1825). When a plate of hot food is put in front of us, we may notice a mixture of aromas rather than one particular aroma. Once we put food into our mouths, aroma comes into play almost immediately through our retro nasal passages (we will come to other sensations in a moment). There is no question that aroma plays a central role in our overall impression, not to mention the enjoyment we receive. If you doubt that most of what we describe as taste is in truth aroma, pinch your nostrils together with your fingers the next time you eat or drink. When it comes to wine, a good glass – of adequate capacity and filled half way – allows us to swirl and release the aroma. Putting our nose to the glass, we can capture all that the wine has to offer. Then, taking a sip, we “taste” the wine and swallow, once more experiencing the aromatic dimension. There are 400 volatile compounds that have been identified in wine. Some would say, in fact, that the initial aroma (nose to glass) along with the aftertaste – which is principally aroma – combine to offer the most exciting and enjoyable elements of wine drinking. Yet, most people still misjudge and underestimate the role of aroma, describing aromatic elements as “flavor” or “taste.”

### **The primary tastes**

Returning to the sensations of food in our mouth, we can identify relatively few stimuli, leaving aroma aside. It has been believed for many years that what we sense in the mouth is limited to a small group of “primary tastes”: salty, sour, sweet and bitter. There is so much confusion on the subject of taste even on the part of many in the

wine and food industry. Perhaps, this should not be surprising, since employment in the trade is not predicated on passing a sensory examination. Many professionals may be good in business but are *not* good tasters. In a recent book by a well-known professional about pairing wine and food, I was surprised to find aromas like strawberry or butterscotch described as “flavors” rather than aromas. Reading further, I found that the writer was right in pointing out that the so-called flavors would be generally consistent with what the nose detects – implying that they are somehow not the same!? There was no clearly stated recognition that these so-called flavors define the finish or aftertaste more than any of the primary tastes. I am not wedded to semantics despite what you have just read, but I am insistent on presenting essential principles accurately!

We should not discount the importance of sweetness or sharpness or the other tastes, and for those whose olfactory hardware limits their ability to notice aromatic nuances, they do comprise a larger share of taste. Texture must also be counted as a contributor to taste. Foods can be thin like water, thick like peanut butter, coarse like granola, crunchy as pomegranate seeds, even sharp and pointed like hard pretzels. Consider also that chewing reverberates through the bones of the skull, adding sound to other sensations; foods can be loud or quiet.

### **Irritation as taste**

What about the sensation of carbonation that millions of people around the world find so irresistible? Scientists describe the effect of carbonic gas as an irritation, but we may well think of CO<sub>2</sub> as mildly anesthetic. Well beyond the refreshing gassiness of

Sprite, Pepsi and Perrier, there is the fiery world of the chile pepper that is integral to many cuisines, and an acquired taste in many others. Those unaccustomed to hot peppers find their effect to be a discomfort, or even painful to varying degrees – but not everyone finds that pain unpleasant. On the contrary, there is something addictive about hot chiles. While scientists tell us that this “heat” is detected by our nerves and not our taste buds, we can understand why, in China, the heat of peppers has long been included among the basic tastes. We could make a good case that the taste of many Mexican, Thai and Indian dishes is always associated with what can be an incendiary assault on our palates (some of us need that “fix” regularly). Thus oral tastes are not governed solely by taste buds on our tongues, but by other sensations transmitted to the brain through our nervous system.

### **Umami – the taste multiplier**

*Umami* is often described as the “fifth taste”. Difficult to put into words, the concept of *umami* is best described as an accentuation of overall taste along with a savory feeling. *Umami* has been known intuitively for centuries and is the explanation in part for the pungent fish sauces that have been used in many societies up to and including the present. The origin of this unique taste (or is it a non-taste?) was identified in 1908 by Kikunae Ikeda. A myriad of foodstuffs contain the amino acids and nucleotides that create the *umami* effect. Among them are fish like bonito, which is known as *katsuobushi* when dried, smoked and cured, and then used to flavor stocks. Other *umami*-rich foods are the small dried sardines (*niboshi*) that are, with the addition of kelp (*konbu*), essential to *dashi* (the base of miso soup). The term has only



recently entered the Western consciousness, however, thanks in part to my fellow American Master of Wine, Tim Hanni. The *umami* effect can be achieved artificially with monosodium glutamate (MSG), which is added to many Japanese and Chinese foods. The term has attained such fashionable status around the world that there are now restaurants bearing the name in San Francisco, Canada (a chain of kosher eateries!), South Africa, London, and many other places. *Umami* is associated with foods, not wines, although wine and food can be combined, Hanni would argue, in such a way as to achieve an equivalent, savory, heightened taste experience.

Some years ago a “tongue map” was developed indicating exactly where on our tongue we sense saltiness, acidity, bitterness and sweetness. While the map with its zones of perception is still in common use, it has been discredited (by the research of Linda Bartoshuk). It now appears that our taste buds may not, after all, be in identical locations. This should not really come as a surprise given individual variations in so many aspects of our being.

### **Applying primary tastes to wine**

The four key tastes are all pertinent for wine, and a good wine is one in which a pleasing balance has been achieved. Acidity is a fundamental building block without which wine would seem flat and dull. Wines with excessive acidity appear sharp, tart or possibly even sour, although this extreme is very uncommon. Sweetness normally comes from the remaining natural, unfermented sugars in dessert, late harvest or fortified wines (or from added concentrate). In wine terminology, a “dry” wine contains no noticeable sweetness; “off-dry” signifies one that is subtly sweet. What is not

generally known is that alcohol is also perceived as sweet. It plays a critical role in balancing acidity and tannin in wine. Few wines are perceptibly salty; yet, potassium bitartrate, naturally present in wine, does have a saline flavor. Many wines are stabilized at low temperature in order to precipitate the tartrates so as to avoid a crystalline deposit in bottle (which, although completely harmless and aptly nicknamed "wine diamonds," needlessly worries some consumers). Tannin, the polyphenol that along with acidity provides the structure of red wines, allowing them to age and develop in bottle, can be bitter to varying degrees. It is in no way a flaw for a young red wine to leave a somewhat tannic impression, as long as it is not out of balance with the concentration of the wine. It merely signals that the wine will be better if it is cellared for a period of time, after which it will presumably be smooth rather than astringent (along with other enhancements derived from the aging process). Thus wine also possesses texture. Tannin leaves a rough coating in the mouth which is different from the drying sharpness of acidity. To understand the difference clearly, lick a cut lemon, wait a minute or two, and then taste a strongly brewed tea; one is acidic, the other tannic. Because they may compete and interfere with or compensate for each other, bitter and sour tastes tend to camouflage one another, as do bitterness and sweetness. A highly tannic and acidic wine appears unpleasantly sharp, hard and astringent; a highly tannic wine that is relatively low in acidity is usually not unpleasant to most experienced tasters. (For more about this entire subject, I highly recommend Emile Peynaud's *The Taste of Wine*.) In recent years, winemakers have done their best to obtain so-called "sweet" (as opposed to harsh) tannins by picking riper grapes,

removing the woody stems prior to fermentation, practicing various techniques to introduce oxygen into the fermenting wine, and pressing the skins as gently as possible after fermentation is completed. But this takes us into a technical realm that is beyond the intent of this paper...

### **The objectivity of taste**

Tasting is an intellectual, sensory and emotional exercise. No taster – no human being – is completely objective. Nevertheless, some individuals have truly remarkable analytical powers, and controlled tests prove that they can identify odors and tastes at low concentrations. So while it is often said that taste is entirely personal, there are objective elements that can be recognized by appropriately discerning individuals (at least the “super-tasters” of this world). These are not only those trained to recognize such attributes, although learning does greatly enhance natural ability. The level of residual sugar, acidity and tannin can be measured chemically, and good tasters can accurately reflect the laboratory analysis in at least general terms when confronted – as in the Master of Wine examination - with an unidentified glass of wine. For example, Riesling from the cool growing conditions of the Saar River, a tributary of the Mosel, that contains very high acidity levels (up to 10 grams per liter of titratable acidity), relative to the range in wine generally, can be correctly and objectively described as “high acid”. The same taster can also identify, despite the acidity that makes this wine seem deceptively “dry,” that the wine also contains “low to moderate residual sugar” of 1% to 1.5% by volume. Even aromas that we associate with familiar fruits, vegetables

and spices, which are considered the most subjective of all our reactions, can have a basis in the actual chemical composition. For example, esters brought about mainly by fermentation can be perceived as fruity, like bananas or pineapple, which are associated with Ethyl n-butanoate and Ethyl n-hexanoate. What is noted as herbaceous in a number of wines – green bell pepper is one common descriptor – can come from methoxypyrazines, another volatile compound. These substances are found in plants and several grape varieties: Sauvignon Blanc, Cabernet Franc, and Cabernet Sauvignon. Aldehydes can have an almond (benzaldehyde) or vanilla (vanillin) odor often noticed by tasters. A buttery smell commonly noted in rich, barrel-fermented Chardonnays is derived from diacetyl, a ketone. Wine aged in barrel can absorb oak lactones which have an odor resembling coconut. We could go on and on, showing how commonly-perceived aromas are based in chemical fact. At the same time, it has to be admitted that many tasters are also capable of inventing fanciful descriptors that come strictly from their own imaginations.

The human palate is far from a precision instrument: our powers of discernment will never attain the accuracy or reliability of laboratory analysis. Nevertheless, a taster with the right sensitivities can be remarkably accurate in the identification of objective attributes. Philosopher Barry C. Smith, who has written widely on this topic, explains that “it is through the subjective experience of tasting that we gain personal access to what is objectively there in wine. It doesn’t mean it only exists for each of us.” (*The Objectivity of Tastes and Tasting*, “Questions of Taste, 2007).

An amateur taster is one who has quick, superficial reactions, does not analyze (and often misses) the fundamentals, and resorts to highly subjective descriptions. An uneducated taster *drinks* the wine and might say that “this reminds me of strawberries and whipped cream.” An amateur with a good mind and a reasonable degree of sensitivity may, however, learn the discipline and language of tasting with the right coach and sufficient training. Tasting – whether of wine, whiskey, tea, coffee or chocolate – involves the physiological attributes we have been discussing as well as a shared lore and vocabulary. To the disinterested and uninitiated, these rituals and terms can seem bizarre and ridiculous, like cricket to an American baseball fan!

A professional wine taster is one who is as dispassionate as possible, capable of holding the extremes of subjectivity in check. A pro focuses on the essential components: concentration, weight, acidity, tannin, persistence, balance, state of maturity, soundness, and overall quality. A true professional is also able to control – but not eliminate entirely – the distractions and suggestions coming from the environment and from within. A professional always *spits* out the wine after tasting, knowing that analysis is quickly corrupted once alcohol is consumed. A seasoned taster would describe a young red Bordeaux from Saint-Julien (wines which tend to develop with bottle aging and are dominated by Cabernet Sauvignon blended with Merlot and other varieties) in a classic vintage, as having “a dark red color with purple rim; a concentrated yet reserved, undeveloped aroma showing black and red fruits with carefully-judged new French oak; a well-balanced, still largely closed palate with ripe, integrated tannins and moderately high acidity; a firm, dry, clean youthful finish; in

sum, a high quality sample requiring a decade of bottle aging to soften, open and gain length, and having the potential to improve further with another decade or more of cellaring.”

### **Flexibility and tolerance**

Taste, as is plain to see, is a multidimensional phenomenon involving genetics, learning, context, highly variable sensitivities, autosuggestion and other types of bias. My purpose in exploring taste is to show how many factors come into play when we react to food and wine. I doubt that many people have taken the time to examine the intricacies of taste, so this discussion may help put it into perspective. Personally, I find the subject intriguing and intellectually stimulating, and the fact that it is taken for granted, and very poorly understood, makes it that much more interesting. In addition, learning how complicated and variable taste really is should make us look differently at the pronouncements of wine and food critics. A flexible approach that allows for many preferences and sensitivities should be in order. Not everyone has the capabilities to distinguish aromas and tastes and be a discerning taster. Some individuals are highly sensitive to bitterness and acidity and find certain foods and wines unpalatable. Others lack sensitivity of one type or another and always seem to be out of step with those who have a “truer” judgment of whether something is salty, acidic or sweet. The other side of the coin is that hyper- sensitive individuals may actually enjoy wine and food *less* than the average person. So if you are not a “super-taster”, you should not worry as you will find pleasure in far more wines and foods!