

Ever watch a candle burn?

THE PROLOG

Some candles drip. The wax runs down the side of the candle onto Chianti bottles, or Jack Daniels bottles, or Courvoisier bottles... The wax castles are pretty. Sometimes I wondered why so much wax was wasted. It seemed that a proper candle should burn it all.

Some candles never get a chance to drip. They're the big wide candles, the ones that form a pool of molten wax that sinks into the candle with great slowness and takes the flame with it.

I have seen a very few proper candles. Ones which neither drip nor build walls. Perhaps the proper burning of a candle is of little interest to its makers. Perhaps the esthetics of wax castles or walls overweigh economy of function.

If a science could be made of candle-study. If the combined minds of humankind could be focused on the potential of wax and flame. If there were a branch of philosophy which dealt with the meanings of a candle, and the lessons to be learned therein, what grand frontiers might be opened? How little we know about that which we accept.

I propose a simple experiment in natural philosophy. I propose that we examine the burning candle.

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The candle flame is to be considered a point source for purposes of this examination. We can quickly see from scrutiny of the diagram that d = actual diameter of candle section; D = diameter of criticality; and ϕ = angle of conflagration declination.

The example represents a typical "steepled" candle, wherein the apex descends into the normal cylindrical shape. Such candles rapidly consume the apex and enter a steady state. It is in this steady state that we observe what is characterized either as "drip" or as "wall building."

Our discussion is concerned with D , the diameter of criticality. We consider three cases.

For $d < D$, material is consumed at such a rate as to keep ϕ constant. This condition prevails during primary apex consumption.

For $d = D$, material is consumed at just such a rate as to equal the rate material can be freed from an area $= \pi \left(\frac{D}{2}\right)^2$.

This condition represents the ideal candle from the viewpoint of economy of function.

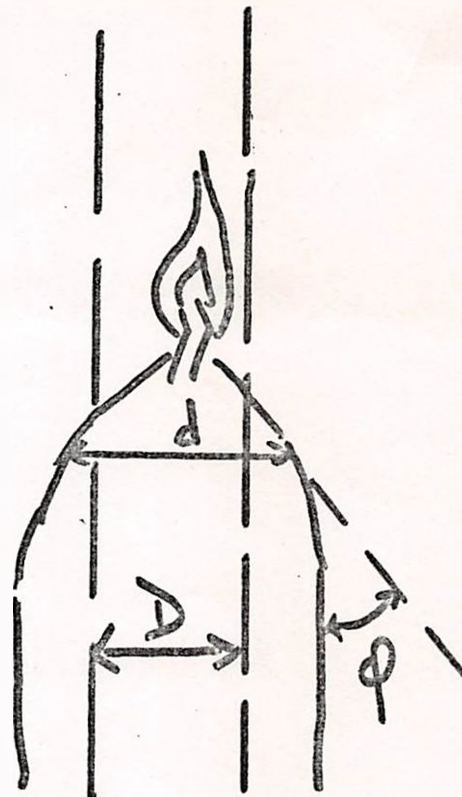
For $d > D$, the rate of consumption of material is less than the rate with which such prepared material can be supplied. It is important to note that wax must be molten before it can flow up the wick and be consumed by the flame. Thus only molten wax may be considered as prepared material.

In the equilibrium condition, only so much material as is required will be produced. The producing region -- the molten volume -- will tend to optimize. This optimization occurs geometrically, because the influence necessary for preparation of the material emanates from a point source.

All regions receive a spherical section, of which a unit section varies in benefit received as a function of the cube of its distance from the point source. Thus

$$\text{BENEFIT RECEIVED} = K \left(\frac{d}{2}\right)^3$$

The producing region will be a spherical section with its vertex at the point source. The rate at which the point source can consume prepared material controls the rate of supply, which determines the volume, and thereby the radius, of the sphere of consumption. We may see K as a measure of the strength of the point source.



Thus our conclusions may be drawn with unhesitating conviction.

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It is the strength of the flame which controls the critical diameter (D) of a candle.

The flame demands only enough material to sustain itself.

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When we ponder this model, we can understand that it is the inherent properties of resistance to flame in the material -- resistance to preparation and thus to consumption -- which control the critical diameter (D) of a candle.

The flame has no internal governor. The material permits the flame to consume only as much as the material will innately allow.

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Thus it is the combination between flame and material which allows a cozy equilibrium, in which each partner delivers just as much of self as is comfortably handled by the other. They complement.

Equilibrium is a relationship.

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Truely it is neither the flame nor the material nor their combination which rules the constellation. The ruler is the condition, which came of itself and departs in like manner -- so far as the flame and the material know.

We shall find that condition is the secret of being. It transcends and ignites. Condition is the synergy of elementals.

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Thus the condition of ignition fixes the matrix of events in order to sustain itself. As such, it is itself a static state. It cannot be the ruler we seek to find. A ruler, by definition, must be an active state. I propose this ruler to be the catalytic agent which brought about the condition of ignition.

The ruler of a condition must be external, for a condition is a static state by virtue of its continuance -- and tendency thereto. It is the catalytic agent which brings about a condition.

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While I must respect my learned colleague's opinions, I venture to remark that this "catalytic agent" which was so glibly presented to the reader can hardly be presumed to be the ruler which my colleague rather drolly suggest that we seek.

One can't help but notice that any ruler must control a process. Our friend's "catalytic agent" can do nothing more than intitiate a process.

A process, after all, has a beginning and an end, else it is uncontrolled. Nothing that can not end a process can be its master.

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Thus it's clear to me, at least, that there are too many good ways of looking at how a candle burns down to believe than any one of them is solely true. I think that whatever is, just sort of "is." It's the Tao, the universal spirit. Or, as the great philosophers of American TV commercials say, "It's where the rubber meets the road."

Theory is only as good as as much of it that intersects with reality. But that last sentence is as ridiculous gramatically as it is theoretically.

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Well, candles burn down the way they do because that's the way they do it. Quite true. But no reason to say there is no explanation because there are many. The explanations are all true, in their fashion. The sooner one learns this, the sooner one learns that it is not the laws which control things, but the mind which understands the laws. Laws are tools for the mind to use.

The secret is understanding. Understanding is too vast for any single statement to encompass.

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It is the mind which controls the means.

Laws are just tools. Laws are to be mastered. Understanding is just another way of saying the mind is functioning properly. There is no understanding independent of the mind. It is the mind which controls everything!

What does a burning candle have to make it a genuine candidate for consideration by the mind, anyway? A candle is a commonplace object. It's laws are clearly quite simple cases of much more important and universal laws.

I shall demonstrate this point. I shall reduce this presumtuous candle to a merest nit of insignificance.

If you will be so kind as to turn to page 1, I shall begin my devastating analysis.....