Part III *Forever Blowing Bubbles*

In a letter dated May 2nd 1820, David Ricardo wrote: "After the best consideration that I can give to the subject, I think that there are two causes which occasion variations in the relative value of commodities - 1 the relative quantity of labour required to produce them 2ndly the relative times that must elapse before the result of such labour can be brought to market." Ricardo's first cause, the quantity of labor, led to the economics of Marx. The second cause was largely ignored by later economists, until the deficiencies of their model of static equilibrium became too large and too unrealistic to neglect.

We now can see that Ricardo had worked his way to a rudimentary gradient of the kind we have been considering, heat and time. He did not work out that labor and time are two aspects of a single process and that the value of either is determined only by their combination or substitution within the process of production and consumption. Ricardo did know that both time and labor had to be paid for and that savings, in the form of capital, would be necessary to provide for production until its costs could be recovered in the market.

Within this process which will be defined by its boundaries, that is, the points at which there are zero differences, there will be a temperature (for example) and a moment that produces the best waffle (for example) for the least expense of heat and time. If we try to have our waffle before that moment is attained, we will have only a cow flop; if we wait too long, we will have carbon. Ripeness is all. (For those who are tired of the waffle metaphor, there is a similar gradient that may be more to their liking: grape juice, wine, vinegar.)

The value of savings can only be found at such moments. If we lose the moment we may have wasted some or all of our effort; effort may be repeated, but the time spent will be gone for good. Under the circumstances it would not be surprising if we became rather anxious about not missing the moment, since the moment of fruition determines the value of all that led up to it and provides the content for the subsequent process that leads to the next moment. Here we find the source of that interdependence that informs markets. Gradients lead to moments, moments can only emerge from gradients. Value both determines the movement along the gradient and in turn emerges at the point of fruition.

Should we be anxious about missing the moment? Processes that take time are processes that can go wrong. We may set off for the market with our basket(s) of eggs only to discover that a jackknifed big-rig carrying nitrogen fertilizer has blocked the highway with the threat of blowing everything in the vicinity to kingdom come. This is not a moment we care to experience. We may not have put all our eggs in one basket, but if there is only one road to market and that road is blocked, your little baskets count for nothing. We will, in due course, have to think more about this matter of access.

Anxiety about the moment may be in some proportion to our belief as to whether a similar moment may come again. *Carpe diem* as they said in the 17th century: seize the day. We will pass this way but once. I was not entirely surprised to find quoted on the editorial commentary page of a recent *Barron's* financial magazine, a propos of the collapsing financial bubble, the lines from the poet Robert Herrick:

"Gather ye rosebuds while ye may,
Old time is still a-flying:
And this same flower that smiles today
Tomorrow will be dying."

I myself prefer the poem by Andrew Marvel, "To His Coy Counterparty". . .er, Mistress, which begins "Had we but world enough, and time," and goes on to the lines:

"The grave's a fine and private place,
But none, I think, do there embrace."

Our notion of opportunity carries the promise of possibility, of a chance to experience something that may not have been there before, and, perchance, may not be there again. Compared to the sentiments of the 17th century, the mechanical model of economics that the 19th century produced has a dreary Calvinist cast to it. We come into the world (the market) with our given endowment and through the deterministic equations that sternly sort out supplies and demands, our hopes and desires are reduced to the predestined prices of compliance. We come to the market with our differences, we leave with all differences reduced to an equilibrium that is deemed satisfactory to all. It is a world without risk and it is also a world without hope.

Hope and risk are inseparable companions. They are traveling companions. They accompany the uncertainty of the journey from 'here' to 'there' and from ' now' to 'then'. Hope eggs us on (no pun intended), risk warns us of dangers. They are not the best of companions; one is given to irrational exuberance at the outset, the other to a nasty 'I told you so' at the conclusion. Better to ask for directions.

To seize any opportunity we must weigh our chances of getting there against the cost of giving up here and now. If here and now is a miserable situation, then leaving it entails no opportunity cost. Anywhere else could be no worse. But leaving does not mean arriving: there could be rapids on the river, bears along the trail, deserts without water and so on. How are we to weigh our chances? We need information. Are we not fortunate to live in a time where virtually every aspect of our world has been mapped and catalogued, a world of GPS navigation and Google searches and hadron colliders. Every aspect is at our fingertips except the one we need to know: the future. If this map of the world we have now attained does much to reduce risk, it also gives us much less to hope for. We still cannot predict the future. But we know a lot more about what it will *not* contain. (Here be dragons? Alas, no. Life on Mars? No. Unicorns? Probably not. Black swans? We are finding out.)

Weighing risk and hope means assessing the probability that what we hope for will happen, or that the risks to our happiness will not materialize. How do we come by this concept of probability and how do we use it? Picture a swamp, one that we must wade through to arrive at 'there'. There are, so we are told, dangers beneath the surface of swamps, and real dangers that we can almost see. Alligators are in the swamp, and old Jeb there has a missing leg to prove it. Gators look like floating logs. Is there some way we can plot a course through the swamp that allows us to step on the logs and not be bitten by a gator? Solving this sort of problem is what gives rise to the concept of probability.

Discussions about theories of probability are endless and are as treacherous as swamps. What we are trying to do with probability is to make our guesses about possible outcomes as reliable as knowing an outcome. We can only begin an assessment of probability with what is known, or at least what we think is known. What is known is what has happened in the past. Whether and/or how we may rely on past knowledge to sustain our predictions about the future is one of, if not the, most vexing epistemological questions. There is an enormous literature on the subject. On some other occasion we may want to assess the assessments. For now, I would just like to get across this swamp.

Suppose we could know how many logs were in the swamp. And suppose we could

count how many log-like objects were in the swamp. By subtracting the number of logs from the total of log-like objects, we would discover the ratio of logs to gators, though we would still not know which particular log-like object is which. If there were more logs than gators then our chances of getting across would be good. If we could carry a long pole for probing, our chances would improve even more. And if gators never moved we could map the swamp and others could follow us.

So probability is held hostage to 'if'. Too many 'ifs', which is to say, too many assumptions and too many variables, make it too difficult to calculate the chances of any particular outcome. To make our calculations more reliable we must first reduce the number of our assumptions and then we must expand the number of instances in which these assumptions are tested. In games of chance, for example, coin tossing or dice throwing, there is the assumption that only one surface will be 'up' at any one toss, and that each toss is independent of the one before. This is a crucial assumption. It is however an assumption which must be questioned in each assessment of probability.

Karl Popper and David Miller have attacked the intractable knots of probability theory and arrived at an interpretation which Popper calls the propensity theory of probability. Propensities emerge when we must assess chances which are no longer equal, equal as in each side of a coin or die, where the chances of one side coming up are 1 in 2 or 1 in 6. Popper asks what would happen if the die were loaded, weighted so that one side is more likely to come up than any of the others. Here we can make a prediction based on the propensity of one side to come up more frequently than the others; but we can only discover the exact frequency through repeated throws.

If we try to use Popper's concept of propensity in a domain where *change* is dominant we find that the assumption of independence (of each throw) is considerably weakened. What if the tiny weight which loaded the die were not fixed, but could move from one side to another? Then the propensity of one side turning up would approximate the 1 in 6 probability of chance. But suppose that the tiny weight could only move to an adjacent side and not to the opposite side of the die. The movement of the tiny weight within the die would be constrained in one direction and variable in the others. The probability of one side of the die turning up would be the result of the strength of the variables relative to the constraint, that is, the excluded direction.

This point is sufficiently important, even though somewhat ambiguous, that it deserves a more detailed consideration. The classical statement of probability is a statement of the ratio of the number of 'favorable' cases to the number of *possible* cases, where a limit to the number of possible cases is either known or assumed. In our example of the swamp it is the ratio of gators to logs, the logs being the preferred cases. When we introduce the possibility of change into the situation, we must do our best to locate the means of change to determine if there is some constraint on the situation. If logs and gators could move in and out of the swamp in any numbers and at any time we would be up the creek. Only if the motion of individual logs and gators came to a statistical balance could we assess the probability of finding more logs than gators. This is what is meant by 'statistical'. It means that some large number of single events leads to some kind of regularity within the whole or total number of events.

It does not mean that at any given moment the probability of finding more logs than gators will equal the statistical probability. At any given time, the possibilities of the next moment are uncertain. A probability calculation may limit that uncertainty but it does not remove it. Propensities are a guide to what may happen, but not necessarily to what will happen. But with some effort and with growing knowledge we may be able to find the limits to what may

happen. If we find there are constraints on the movement of log-like objects we may search for the value that constrains the variation of movement. Once we have that value we may calculate the propensity of log-like objects to be gators.

In a fully constrained system (we are thinking of the swamp as a system) the propensities would conform to a fixed ratio of logs to gators and their positions would never change. We could map the swamp, and as long as we don't fall off the logs (that is another kind of risk) we could safely cross. In a fully variable system, the propensities would exist only as a statistical probability, and at any one time we could not calculate our chances. In that kind of system we could only test the waters with the very brave or the foolish or the helpless.

In our feckless desire to *carpe diem* we sought the opportunity *du jour*, the moment of the perfect something which would not come again. In the first field of endeavor of the day, the breakfast table, we sought the perfect waffle. Perfect, so it seems, is not an absolute quality that all perceive. However, anyone's perfect waffle must be the result of the same combination of factors; only the variables of that combination may change. The combination is constrained by the chemistry of the batter and the efficacy of the waffle iron. The gradient, the combination and substitution of time and heat, is constrained by the direction of time and varied by changes of temperature. The value of the combination is a proportion of time and heat which produces the best waffle with the least expense of time and heat.

There is a puzzle here which we may chew on while waiting for our waffle. Any process which requires time, that is, which moves from 'now' to 'then' is subject to uncertainty. As we have come to understand, the way we assess the risk inherent in uncertainty does not lead to the knowledge that guarantees a perfect waffle. It leads to the chance of a good waffle, but not necessarily a great waffle and it may even lead to a cow flop. If you want a perfect waffle you need my grandmother, which means a mastery of the process of batter, waffle iron, and timing. In some way that has yet to be explained, we sustain the gradient of waffle-making with the skill that is the product of knowledge guided by a range of values that reduce the risk inherent in any time-using process. Knowledge is a governess that keeps those inseparable traveling companions, hope and risk, from incessant quarreling.

How does she do it? She has many tricks up her sleeve and this is not the occasion to expose them all; but we can reveal one. She has a map. Here I must draw your attention to a simple yet difficult distinction. A map is not the contents of the map even though there is no map without specific contents. Once we know how a map 'works' - and I was once subjected to a lengthy lesson in map-reading in ROTC - we may use a map to find our way in unfamiliar territory. This capacity, the capacity to translate the information contained in one form into a corresponding perception of another form, leads to the kind of knowledge we need to diminish the uncertainty of change. Nonetheless, all maps - and we expand the methods of maps to include all models, such as economic models - carry, or should carry, an explicit warning label: this map may be incomplete, it may be false, and no information conveyed or implied is guaranteed. If the model proves too feeble for its task, we may lose our way. Hope and risk will resume their incessant quarreling.

There is something to quarrel with in a recent statement about map-reading in *The Economist:* "In strange territory almost any map will do, no matter how incomplete or out of date. In trying to pick a way through today's financial crisis, there are plenty to pore over." Surely

the map which got us into the mess will not do. If we were only trying to go from 'here' to 'there' we could retrace our steps and begin the exploration anew. But we are trying to go from 'now' to 'then' and there is no going back, no do-overs. The map which gets one into a mess must be rejected. We must pay attention to where it went wrong. Here be dragons, after all.

We are prone to ignore warning labels. So let's 'fess up: the one map we really desire is the one with a big *X* on it, the one where '*X* marks the spot', the spot where the treasure is buried. We can accept that there are pirates in the world if they leave behind a map to the treasure. With that sort of map, and our secret decoder ring, we can change the course of our lives once and for all. This is how financial bubbles begin. Someone walks into a room with a map that has a big *X* on it. In the arena of financial bubbles the map with the big *X* is usually not a map to 'there' (although in the case of the infamous South Sea bubble it certainly was) it is a map to 'then'.

Why should we believe in it? 'Then' is the undiscovered country. There could be no map of that country. Yet we want to believe. We want to believe that the road on our map does not end at the edge of the map but continues on to the longed-for destination. After all, the road that we traveled yesterday is still here today. Why wouldn't it be there tomorrow? The regularity of the world gives plausibility to probability. We count on that regularity to manage our day-to-day lives. But offer us a treasure map and we turn the statistical probabilities that produce that regularity inside out. There may be but a remote chance that the treasure map is correct, but we're willing to take that chance. Probability provides a loop-hole that certainty excludes. If nothing is certain, anything is possible.

Not too long ago a neighbor remarked that we were "sitting on a gold mine". He did not mean it literally; it was a metaphor, like the many metaphors I have used for this discussion.

He meant that without any effort on our part, the value of the property we could lay claim to was increasing. Ricardo would have been skeptical. Values that increase without effort would not be easy to measure. Of course, there is that matter of time to market. Perhaps the increasing value that my neighbor detected was a function of time. Perhaps it is a new sort of gradient with an unspecified factor. It is easy to have a map or a model with an *X* in it. It is not so easy to find what the *X* really stands for.

The financial and economic crisis that the world is stumbling through at present had its roots, so they say, in the collapse of a housing bubble. How could housing - after food, water and clothing, the most basic of human needs - lend itself to the delusions of a financial bubble? Houses require effort; effort to build, effort to maintain. The 'goldmine' that we were supposed to be sitting on referred to an increase in value that came about without effort. Where might this increase have come from?

It could not be just an increase in population, relative to the number of houses, or even relative to the rate at which new houses could be built. Unless per capita income increases, which is to say the money available to spend on housing increases, the price of houses will not increase. Without rising incomes, all an increasing population can do is lead to higher density of occupancy.

Rising per capita incomes would seem to be a necessary condition for rising house prices. Yet it need not be the case that rising house prices mean increasing value. If an individual's income rises, might she not prefer a *better* house; more space, perhaps, a newer kitchen, or a location closer to other amenities. (Amenity seems to be a term that now survives only in the context of real estate.) Why would anyone want to pay more for the same house;

which is to say the same housing.

Markets, as we have been at pains to point out, are the product of differences. A rise in the price of houses must begin with a difference in income; someone's income must rise before others. In fact, this is how all price rises begin, known to (some) economists as the Cantillon effect (named in honor of Richard Cantillon [c.1680-1734] who first described the process by which new money which comes into an economy raises prices; not all at once, but sequentially, as rising incomes increase demand for more valuable goods). In the case of real goods we would expect that as effort is redirected to supply the new demand, rising prices would level off.

A bubble is characterized by prices which increase with no effort on the part of one who claims possession of the *X*, a factor derived from, though not necessarily identical to its conveyance in exchange. A house may change owners, but what is being exchanged is not the house, but the value of the house; in the case of the housing bubble, it was, perversely, not housing.

How can we say it was not housing? Rents did not rise at the same rate as house prices. The U.S. Bureau of Labor Statistics, which is charged with contriving the consumer price index, stubbornly refused to allow the number which they assign to housing in that index to rise at anything near the rate of increase in house prices. The number which the BLS uses is an *x* variable that represents a rental equivalent to owning a home. The BLS insisted that the proportion of the consumer price index which represents the cost of housing - and it is a large proportion - was increasing at only a modest rate. This meant that the price of houses was increasing faster than the overall increase in the consumer price index; it also indicated that the price of houses was increasing faster than incomes.

What did we think we were buying when we bought a house? We believed we were not just buying a house but investing in some sort of asset. What do we mean by an asset? It is something which produces a return (a positive addition to goods or services) without being diminished by the production. In the production of waffles, for example, eggs, milk and flour would not be assets since they would be consumed in the production process. The waffle iron and my grandmother's skill would be assets since (within distant limits) they remain undiminished by use. The value we would place on those assets would depend on our expectations about future waffles.

Economists are in the habit of placing assets into categories, such as capital assets and monetary assets and so the meaning of the term becomes a little more diffuse with each subdivision. The military, for example, loathe to forego any opportunity of cloaking the stark reality of their occupation with an impersonal-sounding euphemism, refers to weapons as assets. Capital assets are not bad things. We could not have waffles without a waffle iron. The advantage of capital is that it increases the efficiency of the other factors while remaining undiminished (within measurable limits) by use. This advantage gives capital a position to claim a larger share of the total production than may be deemed entirely fair by the other factors.

The location of a house (which is not replicable: a given house is always where it is and no other house can be there) and its relative durability lets us think of houses as a capital asset. After all, they can be rented and will provide a return with only modest effort on the part of the landlord. (Some efforts being considerably more modest than others as any tenant will attest.) The asset price of houses should then reflect the rental value of properties, and rents must be proportional to income. But the rental value of houses, as noted above, did not explain the increase in house prices during the bubble.

Where did the 'goldmine' effect come from? The initial rise must have come about

through an increase in somebody's income. The Cantillon effect charts a wave of increasing prices that follows from an increase of money into an economy. We have not discussed how money and 'real' goods are connected - that will require another whole essay - but we did contend that money must be the result of saving income from the production of real stuff. We have also discussed the difficulty of finding a value for savings and this difficulty extends to money. When money is simply being 'held', before it is spent on something, its value is uncertain, a matter of expectation, subject to a range of propensities.

If someone arrives with enough money to pay us more for the house than we paid, we really ought to wonder where the money came from. The money may have come from increased productivity (a better waffle-iron?) Or it may have come at the expense of someone else. If the latter, then it would mean there could be no increase in average house prices. If one house is going up in price, somewhere there is a house which will fall in price. If more prices go up than down, we guess that somewhere in the world productivity is increasing and we get to be the lucky beneficiaries.

Our 'goldmine' effect could be the effect of a discovery of a real goldmine somewhere else. Except this still doesn't explain why the new money doesn't encourage the production of new and better houses, leaving prices on existing houses unchanged, perhaps even falling if population is not increasing. (As happened in Japan in the past decade following the collapse of their property bubble.)

We must experience a difference in the rate of increase in money incomes and the rate of increase in the supply of houses. Here is where we must pay close attention. It is the supply of houses *on the market* that counts, not the overall number of houses. A change of ownership of a house is between one buyer and one seller. If there are more potential buyers than sellers, someone must be willing and able to pay more than the others. If incomes overall are not increasing (relative to the price of the house) then the money offered by the successful buyer must come from somewhere else. It must come from savings converted to money and available to the buyer. This need not represent an increase in income, but a willingness to spend more of that income on housing and less on saving.

So it need not be the case that house prices are always tethered to incomes. A willingness to spend more of a given income on houses may be sufficient. (If so, this must lead to less spending on something else, or less saving. It will mean a *shift* of income within the economy and over time house prices will have to conform to this shift. The economy will be left with relatively more expensive housing and whether everyone will be happy having to pay more for the same old houses will remain to be seen.)

Housing bubbles begin when more money comes into a market than houses. If a house sells for more than it cost and if and when this value is confirmed by subsequent sales in the same market, we experience the conversion of houses from capital assets to financial assets. The value of a financial asset is derived not from its present return (rent, for houses) but from its expected increase in price in the future (the expectations which govern the stock market, for example). This expectation ('sitting on a goldmine') can be sustained as long as money comes into the market at a faster rate than houses are offered for sale.

This expectation of increasing prices may only be an illusion, derived from a version of the fallacy of composition. The value of all houses in a given neighborhood will be based on the price of the last house sold in that neighborhood (adjusted, of course, for differences in size and quality). The price of the last house sold was a product of the aforementioned difference in

the rate of money coming into the market and the rate of houses offered for sale. If all the houses in the neighborhood were offered for sale at the same time, the ratio of money to houses would be radically altered. The probability of the price of any one house increasing must be weighted by the total number of houses offered for sale. In valuing our own house we neglect to take account of the fallacy involved, as do appraisers and banks and neighbors. We suspend our caution as to the uncertainty of the value of any asset and rush to dump our house on the market before our less nimble neighbors can get it together.

If our timing is good, we may dump the house into the eager embrace of a buyer who is anxious not to miss this opportunity. In a bubble, it's always *carpe diem*. But if everyone is trying to seize the day, who is saving for another day? Only the very prudent or the very foolish, it would seem. If we could trick them into letting us borrow their savings, we could seize the day and repay the borrowing from the increase in value of the house when we resell it tomorrow. Clearly it would be a win-win arrangement. All we need is someone to perform the trick.

Remember the banks and the vault? Banks come to regard their vaults as something akin to a roach motel. They make it very easy for individuals to deposit their money with them, but collectively almost impossible to get it back. The goal of every bank is to have as many withdrawals as possible matched by a comparable deposit. It becomes a statistical 'float' much like the gators and logs. The banks make money by lending out deposits, knowing that the money would be re-deposited by the borrower and thus again available to either pay off an annoying depositor or lend again to a feverish home buyer.

Banks are not at all averse to lending money to buy houses. The bank retains a lien on the property (the mortgage) to secure the value of the loan, and if prices are rising, the bank assumes there is little risk of not being able to recoup. Credit is quickly drawn into housing markets with rising prices. So the 'goldmine' effect is really the effect of the 'gold' coming out of bank vaults. The illusion that the value of property is rising without effort conceals the reality that the perpetration of the illusion depends on borrowing the savings of past efforts, to be repaid by someone's effort in the future. The effect can continue as long as the gold lasts, and the gold will keep coming as long as the banks can multiply their lending of other people's money.

A housing bubble, like any financial bubble, depends on the increasing use of other people's money. Is there not some risk inherent in this process? You betcha. At some point necessity will dictate that one of those other people will want her savings back. If a lot of savers wanted to claim their savings at the same moment they would discover how little is actually in that bank vault.

In the concluding part of this essay, we will look at risks and rewards from the distribution of credit. There is no crystal ball inside a bubble.

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