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NEEDS, VALUE, and TIME

being Chapter Six of
A GENERAL THEORY OF VALUE
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*S*atisfaction comes from an appreciation of the present fullness of our lives in the light of whatever greater life—whatever greater Ω —seems possible.

Happiness comes from the increase of our satisfaction, which is also the diminishment of our feelings of neediness. The feeling of neediness is the report of our bodies and "old brains" to our newer, planning-and-remembering brains that more life—higher Ω —can and must be had.¹

Pleasure is a measure of the time-intensity of happiness, which is to say, the rate of change of satisfaction.

Things have *positive value* by virtue of their propensity to increase our satisfaction, and negative value by virtue of their propensity to decrease our satisfaction.

These definitions—all from earlier chapters—are not dissimilar from the ones commonly used by utilitarian and economic philosophers. In these circles my definitions should cause no consternation, aside, perhaps, from the connection I suggest to Ω and all that that implies. In this chapter we move a step closer to standard economic theory—to its fundamentals, anyway. We will look more closely at how the production and consumption of "goods" brings about the satisfaction of one or more of our needs, and we will do so with an emphasis (1) on the temporal dimension, and (2) on the different ways in which different kinds of goods yield their value to us. We will want to know: Is there any pattern, any regularity, in how a person values the same good differently at different times, or in how different people value the same goods differently at the same time, and so on through all the permutations? Why is that essentials are cheap and luxuries are expensive...except in "bad times," when the reverse is true? In short, are there distinct "laws of want," as Friedrich von Wieser described them in 1893?² The entire discipline of microeconomics

has grown up around the belief that there are such laws and that the *law of diminishing marginal utility*—which says the more you have consumed of a certain good the less you will want and value still more of it—is the queen among them. No theory of value calling itself "general" can fail to offer a derivation of this law as well as a way of explaining its numerous and important exceptions in the same terms.

That is what we will to try to do. We start with a review of the relationship between satisfaction and our theory's central variable, complexity-and-organization, Ω , in the social realm. This sets up the context in which needs are expressed and in which the attempt to satisfy them is mostly undertaken.

I. Satisfaction and Social Complexity

As we learned in Chapter Four, in the normal run of events, unmet lower needs "trump" equally-unmet higher needs. But this does not happen without overlap, as Maslow pointed out. Even as a new and higher need comes into view and then takes center stage, one still must ensure that the arrangements that satisfy one's lower needs continue to hold. Also, a higher need can be pursued without the lower one being fully satisfied. One moves on to the higher need when one is satisfied *enough* with the lower need, not as satisfied as anyone could *possibly* be. In real life, the need-satisfaction process is thus not as orderly as the diagram that maps it out—six needs, A before B before C... In fine, the process of satisfying needs is opportunistic, strategic, and risky. The social and natural worlds in which the process takes place are inherently complex.

In Chapter Four (pp. 16–17) we also discussed how the needs themselves evolve in the maturing child by a process of complications and short cuts we called *prerequisites* and *proxies* respectively. This is a reflection of the fact that societies themselves are so arranged that the satisfaction of a person's higher needs usually requires coping with the increasingly complex demands placed on them by others—by individuals as well as institutions. These demands take various forms: further education, larger networks of associations, firmer foundations in ever-elaborating bodies of law, greater finesse in social relations, longer-proven responsibility with money and property (one's own and others'), greater techno-mechanical skills, and so forth. The result is that most people's higher-need satisfactions (and greater total satisfaction) become

conditional upon achieving greater mental complexity-and-organization, Ω .³ Luckily, with the achievement of greater Ω comes the greater *capability* for tackling the next higher need. Such is the miracle of learning. In this context, Ω takes on the character of a productive resource in its own right, namely, cognitive and social capital.

How is this played out with the psychological goods we called tokens? Very figuratively, like this: when a given need is adequately met, a stock of "surplus" tokens directed to satisfying that need starts to accumulate. These surplus tokens are then made available for exchange for tokens from someone else—tokens, typically, that satisfy a higher need. Thus a person who is frequently complimented and appreciated usually finds it easy to appreciate and compliment others. At the same time, and even as she safeguards her position, she begins to educe tokens of confidence from others. Not just from any others, but from those who, wanting her approval, have signalled that they have tokens of confidence (or freedom) to give her. In a word: she "trades up," from dealing in lower-need tokens to dealing in higher-need ones, while at the same time keeping watch that lower-need-satisfaction arrangements remain in effect.

This, at least, is what our basic model tells us. Subtleties and variations are many however.

Methodological difficulties abound too. For example, the *degree* to which a given need is in fact met or satisfied can be judged only by the individual, either subjectively, or, in the case of a group, inter-subjectively. A sufficient level of security for one person may, by any objective measure, be insufficient for another. Indeed, just how much satisfaction is felt to be "sufficient" and just how much is felt to be "necessary" is socially and circumstantially determined: socially by the norms of the environing community, and circumstantially by what is in fact *possible* at a given time and place for a given person (or class of persons) and at what costs. The level of social complexity-and-organization required in order to make people feel fully legitimate in one society, for example, may be far higher than the level of social complexity-and-organization required to have them feel fully legitimate in another. The same is true of standards of fairness and justice in the matter, for example, of how small a slight may count as legally actionable.

Recall from the last chapter that how the needs are named, and how elaborate the means for satisfying these needs are, varies from society to society. The stratigraphy we are working with is modern and Western—and perhaps just American. I would claim cultural universality only for the precedence of survival/security needs over all others, followed closely by

honor/prestige/legitimacy needs. But no matter: the hallmark of a civilized people is the high level of complexity-and-organization of behavior that their society demands from, and gets from, each of its citizens in order to satisfy his or her own higher needs, however these needs are defined and metaphorized.

After all, what is psychological satisfaction but the feeling that marks, accompanies, and rewards success? And what is "success" but mastery of the next-higher level of behavioral complexity-and-organization required of us by society, or some part of it, against the natural information-dissipating processes of forgetfulness and of noise? Life wants more life and better life. This is the way—all going well—that social systems bustle up the slope of Ω , ever elaborating, ever refining, ever enlarging their rituals, tokens, material goods, sciences, arts, and entertainments in both quality and quantity, with no one knowing exactly why and with old people reminiscing (most often quite accurately) about simpler times. This is progress. This is value being produced on a broad front: a social dispensation in which everyone succeeds in finding a way of life, a "niche," that matches their inborn or educated capacity for dealing with complexity-and-organization with the actual level of complexity-and-organization of thought and action required *of* them.^{4 5} And how does society do this "requiring"? Both persuasively and coercively: persuasively, by putting forward images of which actions and attitudes are deemed possible, praiseworthy, and proper for its various citizens, and coercively, by controlling the manufacture and circulation of tokens of legitimacy, security, and survival.

There are differences, then, between individuals and differences between cultures, subcultures, and historical periods in the matter of what and how many goods are enough to satisfy a particular need. A businessman in the top ten percent of income and education in Lagos may be just as satisfied with his life as a businessman in the top ten percent of income and education in London, but the latter, in all likelihood, will be living a faster, more demanding, and more complex-and-organized life, with more tools and technologies at hand. This complicates the already problematic act of measurement by inquiring outsiders. For even if we could claim that the *subjective* stock or frequency of material-good- or token-reception required to satisfy a given need were much the *same* for all people, it would be difficult to assess, objectively, the quantity and quality of the tokens involved. Observers, third parties, and arbiters might well not see or value exactly what the participants see and value.

Nevertheless, and despite all these difficulties for theorists, it is clear that some sort of assessment of a good's actual value *is* made by ordinary people, and the same is true of tokens. These are estimates of the value of both incoming and outgoing goods. To be sure, outside of the classroom, the mathematics employed are rough but rational and strongly guided by social conventions.⁶ But like all goods, tokens satisfy needs, whatever these needs might be at a particular time and for a particular person. And usually, the greater in number are the positive tokens received, the better off is the recipient.

We turn now to exploring how the value of goods is "absorbed," tokens among them.

II. Two Models of the Law of Diminishing Marginal Utility

The connection between the satisfaction of needs and the concept of *utility*, which was introduced by Jeremy Bentham in 1789, and began to be explored in earnest as a basis for modern economic theory a little over a hundred years ago. This was a time when economics was emerging as a separate discipline from social and political philosophy with the hope that it could become not just a handmaiden to governments but a science of value—indeed, *the* science of value—grounded in an accurate and unsentimental account of human nature. The connection between utility and satisfaction was well expressed by the pioneering Austrian economist Friedrich von Wieser, who also sought a general theory of value: "The new theory [of value]" he wrote in 1893, "starts from the old proposition that the value of goods comes from the Utility of goods, or—what is the same thing—from the satisfaction of want which goods assure."⁷ To find the laws of *value*, he said, one must first understand "the laws of want."

Englishman William Jevons and Austrian Karl Menger were among the first thinkers to bring some quantitative form to this concept of value. (Von Wieser was a student of Menger's.) Both Jevons and Menger played down *work* —labor—as the true source of value, something that Marx, returning to David Ricardo, would later try to set aright. Jevons and Menger based their theories of value, rather, on *utility*. Utility was not understood not simply as the (degree of) usefulness of a tool to a task, but rather more broadly as the greater or smaller *capacity* something has—anything has—to satisfy a need to a greater or lesser extent, to produce feelings of happiness in some greater or lesser amount. "The value of a thing," they might have said, "is the happiness

it brings." All else being equal, the greater this capacity the greater was the *price* that would be paid for the good, no matter how that price is measured (e.g., in time, in money, in property handed over, or additional risk accepted). In the matter of valuation, the buyer/user/consumer's point of view—not the producer's—was to be definitive. The producer's job was to produce goods with adequate consumer-judged utility by whatever legal means would keep the good's price both affordable *and* profitable.⁸

Now, Jevons kept the concept of utility abstract, all the better to model markets and the larger economy with mathematical rigor. But Menger retained a lively interest in the physiological and psychological foundations of the theory. He recognized that people's economic behavior, like all their behavior, reflects the fact that human needs are various in kind and urgency. And he observed, as Maslow would again, that human needs replace each other as they are satisfied in some intrinsic order having to do with their "basicness." Indeed, he proposed a scheme similar to the one with which we are now familiar: that people would first try to satisfy the needs most important to them—say, for food or shelter—and only then pay attention to those less important—say, for tobacco or art—and so on, until all their needs were satisfied to the same degree. Why to the *same* degree? Because any need that was *less* satisfied than another would call out more strongly. This would lead the person to perceive greater value in whatever good would satisfy that need, and they would devote concomitantly greater time and effort and money to getting it. Equilibrium is reached when no need calls out any more strongly than any other. Under these conditions also, it could be shown, *total* satisfaction across all needs would be maximized.⁹

But: how to compute the value of a single unit of a good: *one* apple, *one* gallon of gasoline; *one* month of rent? (We might add: *one* compliment.) *This* was the problem for a fledgling new economics.

Menger reasoned in reverse: If a man were to *lose* one unit of any good, he would lose one unit of satisfaction of the least important need he had. The value of one unit of any good *acquired* would therefore be indexed to the extra satisfaction attained by one unit of a good applied to the least important need. On the face of it, Menger's rule is an odd one. But it begins to make sense if we see the value of a good—any good—as a function of *total* satisfaction that it yields, and not of the level of satisfaction of any particular need. That is, Menger's rule holds only under the condition of perfect convertibility of the value of goods *between* needs.¹⁰

Now, we know this is not generally the case: thirst cannot be slaked by cookies, nor lack of confidence by new freedoms (which might, in fact, decrease the recipient's feelings of confidence). Moreover, our different needs are rarely felt with equal urgency, and rarely do we come across *just* the goods we want and fulfill them perfectly. Standards change, as well as beliefs about how much satisfaction is enough. Last but not least, dissatisfaction at a lower level of the stratigraphy has a greater effect on our overall satisfaction than the same amount of dissatisfaction at a higher stratum of need, considered by itself. (This is in part why certain apparently-minor set backs can so undermine us, so take the wind out our sails, and why other events, although large and favorable, do not "deeply" satisfy.) The value of different goods depends on what *kind* of good they are—i.e., what needs they address themselves to satisfying—and this puts a limit on their substitutability for each other as well as on the convertibility of their value "inside us," once consumed.¹¹

How, then, to proceed?

Let us go one need at a time, and leave for later the problem of how to add them up.

Let us try to map out, for a given need, the relationship between the amount of satisfaction a person feels and the number of goods he or she successively receives that partially satisfy that need. There are, in fact, two quite different ways to arrive at such a map. Each of them depends on a different "law of want," a different model of how needs are satisfied by a series of goods over time. I will call them the *shortfall model* and the *dissipation model*. I will describe these models with reference to goods in general, remarking about tokens when they are notably exceptions to other goods.

The shortfall model

This model formalizes the proposition that, for a given need and good, the increase of satisfaction, or happiness, provided by that good is proportional to the distance assessed—the shortfall perceived—between the level of satisfaction currently felt, S , and the maximum satisfaction believed or remembered possible, S_{\max} . Equivalently we can say: for a given need and good, happiness, H , which is also ΔS , is proportional to shortfall, which is S_{\max} minus S .¹²

This statement captures the observation that the happiness we feel upon receiving a much-needed good is greater than the happiness we feel when that same good is not as needed.

It does not so much explain *why* as it models *how* that first bite of an apple is more pleasurable than the last; how that first kiss felt larger than any since. It also suggests the converse: how it is that the closer we think we are to true deprivation, to "having nothing," the greater is the relief—the happiness—we feel upon receiving a good that takes us away from that (feeling of) deprivation. The greater, too, is its value. Let "having nothing" be represented by a current satisfaction level, S , of near-zero. Then, for a given need and good, we can say also that happiness, H (or ΔS) is inversely proportional to S minus $S_{=0}$.¹³

We are sometimes drawn by the dream of satiety (the "carrot"), sometimes driven by the dread of privation (the "stick"). "Shortfall" technically refers only to the first of these two motivations, but because its force diminishes as satiety approaches and vice versa, both carrot and stick—both the dream of satiety and the dread of privation—can both be thought of as expressions of one and the same motivational "force," one attracting, one repelling. To keep our model elegant, we will let the shortfall side do all the work.

Now let us try to put this argument into an elementary algebraic form.

Let's define *shortfall* as the distance we perceive between our present state and maximum satisfaction as a fraction of the total range, S_{\max} -minus- $S_{=0}$, which is effectively the same as S_{\max} . That is:

$$\begin{aligned} \text{shortfall} &= \frac{\text{distance from present satisfaction to maximum satisfaction}}{\text{distance from maximum satisfaction to none at all}} \\ &= \frac{S_{\max} - S}{S_{\max} - S_0} \\ &= \frac{S_{\max} - S}{S_{\max}} \quad \text{if } S_0 = 0 \end{aligned}$$

To simplify further, let's let S_{\max} be equal to 1. (We could just as easily let it be "10" or "100". If we ever had reason to give S_{\max} an empirical magnitude—one that was different for different needs or for different people—we would revoke this simplification.) This allows us to rewrite the above equation as:

$$\text{shortfall} = 1 - S$$

Next step. Let S_{new} be the satisfaction we feel *after* receiving/consuming the good; it is our "new" level of satisfaction. Then happiness, ΔS , is given by S_{new} minus S . If the good in question were the *only*, and very *first* good we received (to satisfy that need) when S was equal to zero, then ΔS and S_{new} would represent a certain original or *first value* that was a function of *what* the good is, how *big* it is, and so forth. Let's denote this first value of the good S_{first} . S_{first} is the quantity that is modified by our current neediness or "shortfall." We then have:

$$\text{happiness} = \text{firstvalue} \times \text{shortfall}.$$

This is easily rewritten as:

$$S_{\text{new}} - S = S_{\text{first}} (1 - S)$$

Rewritten again and transposing S to the right hand side, we have:

$$S_{\text{new}} = S + S_{\text{first}} (1 - S)$$

Now this last version of the equation is interesting and useful. It is called a *recursive* equation since it has to be updated with every reception/consumption of a new unit good, every bite of the apple. With every swallow, the old S_{new} becomes the current S and a new S_{new} is produced, which soon becomes S for the next bite and swallow, and so on, rather like going up a set of stairs where each new step, once stood upon, becomes the current step—the one from which we take a new step.... What we notice, though, is that with every application of our equation, with every step of increasing S , the shortfall decreases and the steps get smaller. In this way, S_{new} steadily approaches *but never reaches* 1.¹⁴ This is shown graphically in Figure 6.1.

Figure 6.1 Satisfaction (utility) and value (marginal utility) on the shortfall model.

Since the *value* of a good is its "happiness-producing capacity," and happiness (or unhappiness) is the increase (or decrease) of our satisfaction, it follows that Figure 6.1 also illustrates the decreasing *value* of each successive reception/consumption of the same good.

$V = \Delta S$. What we have called *satisfaction*, economists call *utility*, and what we have called *value*, economists call *marginal utility*.¹⁵ The *law of diminishing marginal utility*, then, points out nothing other than what you see illustrated in Figure 6.1: the decreasing size of steps-in-satisfaction in the case of the repeated reception/consumption of a standard good.

Economists take this rule to express a deep feature of human feeling and behavior—a rule so rarely broken that it deserves to be called a *law*. But note: if we did not have a fixed idea of S_{\max} the picture would be markedly different. Say, for example, that with every reception of the good one lowered one's estimate of S_{\max} . One would then become less happy (although a little more satisfied) much more rapidly than we see above, and we would not achieve as high a level of real satisfaction. And vice versa: if S_{\max} were *raised* with each event, then the value of each event could be maintained or even increased, and higher absolute levels reached. Indeed, the law of diminishing marginal utility would be averted, or even reversed. That this happens in real life will interest us a great deal later in this chapter. It would seem that a handful of careful definitions and a bit of algebra have yielded one way of deriving the law of diminishing marginal utility—and a way of tackling an exception to it.¹⁶

There is more to be gleaned from Figure 6.1: If S_{first} were small, then it would take many more goods to reach the same level of satisfaction; if S_{first} were large (but less than S_{\max}), then it would take far fewer. But in neither case would S_{new} reach S_{\max} . The shortfall model is telling us this: that nothing less than a good that satisfies completely *in one shot* will satisfy us completely ever, no matter how many more of them we acquire and consume. Realistic? I think so. It "explains" why we live, most of the time, less than completely satisfied. No matter the need, there is always room for improvement, desire for a bit more. The sane among us handle the problem of endless desire rather simply: by establishing a degree of satisfaction that is, for us, *enough*. "Are we completely satisfied?" we can ask at any moment. "No," we can reply, "but satisfied *enough* to move on, to pursue other matters."

We might wonder: how is this oh-so-wise "level of enough" set, and at what absolute (or relative) degree of satisfaction?

Here culture steps in, and our innate sense of economy.

First, culture. Every society sets norms as to what level of consumption, acquisitiveness, and even pure pleasure-taking is considered proper. These standards vary for different classes,

different ages, different sexes, and so on, but once within such a demographic group, the level is more or less set (with a little wiggle room for individual temperament).¹⁷ And how do we know when another person has *reached* that level of satisfaction, or what that level really is, absolutely, on some scale? We don't. We watch their behavior, we ask, we guess; we imagine ourselves in their situation. We set S_{\max} the same way, but by looking for extreme instances.

It follows from the sequential nature of the stratigraphy (which "requires" that lower needs be met before higher needs), that people with their levels-of-enough set low for their lower needs are more apt to be engaging their higher needs. Herein lies the wisdom of the Buddhist and Christian monastic injunction to minimize necessities and to channel desire: it is done, I would argue, not to renounce satisfaction itself, or pleasure, but to attempt higher-need satisfaction all the sooner. Choosing a way of life that satisfies the need for survival, security, and legitimacy simply, i.e. with little complexity-and-organization demanded, allows monks to "move on up" to freedom more quickly—albeit a freedom so subtle, of such small gestures, that few would recognize it as such.¹⁸

Besides, if happiness is the result and measure not of one's achieved satisfaction level, S , but of one's success at achieving *more* satisfaction, ΔS , then this fairly necessitates that we move on to pursue higher needs before *completely* satisfying lower ones. This introduces the economic dimension and what I called our innate sense of economy.

Pursuing satisfaction is rarely done without risk or cost. At some point, attempting greater satisfaction becomes expensive—too expensive: the positive value of acquiring and enjoying the next good is outweighed by negative value of what it would take to get it or by the long-term consequences of having it. Approaching S_{\max} in any *one* need might also jeopardize the arrangements one has made to maintain satisfaction levels of one's other needs. Under these circumstances, seeking mere contentment—"enoughness"—rather than the complete and perfect satisfaction is the wisest course.¹⁹

Just as we set some level of *enough* satisfaction for ourselves, so do we set the minimum level of *necessary* satisfaction, with similar coaching from the culture. When the state of our satisfaction of a particular need falls below this "level of necessary" satisfaction we will devote ourselves to satisfying that need almost exclusively and with a desperation that depends on the stratum of need involved.

All this is illustrated in Figure 6.2.

Figure 6.2 Levels of "necessary" and "enough" satisfaction.

Now, the *spread* between one's inwardly-set levels of "necessary" and "enough" satisfaction is an indication of one's stoicism with regard to the need in question. When the spread is very small, one's behavior is like that of an overly-sensitive thermostat. One alternates between desperation and contentment, and spends little time in the workaday state between. Is this one way to talk about mania? When the spread is very large, one toils peacefully on the slopes, as it were, with little hope of great satiety, but with little fear of privation either.

At the end of this chapter we will discuss a related matter: addiction. This, however, uses our second model of how goods yield satisfaction, namely:

The dissipation model

Here we think of a series of goods valued not because each one brings us closer to the goal of complete satisfaction, like getting to the top of a mountain. Rather, we think of each good in a succession of similar goods as delivering a "dose" of satisfaction, in some sense whether we like it or not—but a dose that dissipates over time, that comes up and passes through us like a wave. This approach leads us to a number of insights that are unavailable on the shortfall model.

Take a small bite of chocolate. After a while, the sensation of sweetness will fade away. Take another small bite. The sensation is boosted higher yet, but it too begins to decline. Take another bite, and another, of the same size...and soon a saturation level will be reached: consuming more chocolate will not intensify the flavor nor increase the satisfactions it yields. Stop. Satisfaction levels will slowly dissipate. Take another small bite of chocolate...

Is the same not true of compliments? A succession of *any* tokens that satisfy the same need will steadily lose their individual potency.²⁰ Why?

The satisfaction given by few goods comes upon us with the sharpness of a blow or vanishes utterly a moment later, be these goods bars of chocolate, tickets to the baseball game, kisses, or smiles. Rather, our satisfaction waxes and wanes smoothly, if only in pleasurable anticipation (yay!) and then in savoring of how good it was (aahh...)²¹

How then might we model the satisfaction afforded by a single, positively-valued good over time? We can use the metaphor of a wave—a "satisfaction wave." We can divide the amplitude of a satisfaction wave into four successive phases:

- (1) an *anticipation* phase, where some satisfaction is felt "prematurely," in the imagination;
- (2) an *onset* phase, where satisfaction mounts upon actually consuming/understanding the received good;
- (3) a *sustain* phase, where satisfaction peaks and holds above a certain level for a period of time; and
- (4) a *dissipation* phase, where the satisfaction afforded—which is nothing but internal complexity-and-organization, let us remember—melts away under the influence of the second law of thermodynamics.²²

The satisfactions provided by different kinds of goods can differ from each other in the time spent in each of these four phases, as well as in the amount of satisfaction they offer to which need.²³ But, in the dissipation model, every successive reception/consumption of a *certain* kind of good is assumed to yield, in itself, the same shape and size of satisfaction wave. Every square of chocolate: the same wave; every compliment: the same wave.

This last stipulation may seem paradoxical, even disastrous for a theory that wants to arrive at the law of *diminishing* marginal utility. Not so. Figure 6.3 depicts, in idealized form, a single wave of satisfaction due to the reception/consumption of one good, by itself.

Figure 6.3 One typical "satisfaction wave"

Figure 6.4, however, shows what happens when a series of such satisfaction waves follow on each other at equal time intervals. If the waves overlap at all—i.e. if the anticipation phase of one starts before the dissipation phase of the previous one is completed—then there is a cumulative effect. But note: after a certain number of goods have been consumed in this way, the total amount of satisfaction reaches a plateau (albeit a choppy one). After the first few

portions, consuming more goods raises satisfaction no further; the law of diminishing marginal utility returns.

Figure 6.4 Cumulative satisfaction from a series of equally-spaced waves

To maintain a certain level of satisfaction is to maintain a certain *rate* of (dissipating) good consumption. (In rough analogy: for a kite to fly, there must be *wind*, which is to say, ever-new air.) Consuming at a faster rate will help S rise—but only until a new plateau is reached. Then, the moment one stopped the regime or let too much time elapse between goods, satisfaction would start to plunge. If one's level of "enough" satisfaction were set so high that the troughs between waves reach below it, then one would be driven to consuming at a faster rate, like a drowning person who could not afford to stop paddling. Preferable is for the *spread* between contentment and desperation (see Figure 6.2) to lie wholly beneath the wave troughs shown in Figure 6.4.²⁴ Examples? One thinks of food or pharmaceuticals. But more subtle examples abound. Imagine buying new clothes at regular intervals. As we become accustomed to having each new item of clothing in turn (and then, as they become worn out or unfashionable), so the satisfaction provided by each steadily wanes over time—not entirely disappearing, but being overlaid again and again by the greater, more immediate satisfaction provided by the more recent addition to our wardrobe.²⁵ Three similarly-built friends can keep each other relatively happy in clothes simply by circulating their wardrobes.

Note that with the dissipation model we need have no prior, independent idea or experience of S_{\max} . The magnitude of S_{\max} is given entirely by the magnitude of the satisfaction afforded by the first and typical good, by the rate at which its satisfaction dissipates, and by the rate at which one consumes more of them thereafter. This stands in contrast to the shortfall model, which requires that we know beforehand, or guess or imagine, what complete satisfaction looks or feels like in order to know how far short of it we still fall. Where, then, are the *limits* for the dissipation model? We know that the higher the frequency with which one consumes dissipating goods the higher is one's average satisfaction, but with diminishing returns to frequency. This gives us one limit. If there were goods whose satisfaction did not dissipate at all, however, and one kept receiving and consuming them, then S would eventually reach infinity! One would die of bliss or boredom. But there are no goods that work this way, and dissipation, which is a

manifestation of the second law of thermodynamics in the body, would seem to be nature's way of protecting us from the eventuality. Indeed, overconsumption, overstimulation, shuts down neuronal function or begins to send pain messages. One slows down. With proper control, S_{\max} for any one need becomes "S-optimal," which is to say Ω -optimal too. As in the shortfall model, one opts for satisfaction *enough*—and moves on to a higher need.²⁶

Now, what of the *value* of the frequently-received good or token? A closer look at the dissipation model is revealing.

We defined the (positive) value of a good as its happiness-producing ability, which is the (positive) change in satisfaction it will engender in a certain (or typical) person. We have also seen how, when goods dedicated to satisfying the same need are accepted at a steady rate, the value of each new good diminishes relative to the one before it: they have "diminishing marginal utility." So far, so good. But whereas on the usual analysis, the value or marginal utility of the umpteenth effectively-identical good falls effectively to zero—this as the slope of the utility curve (read: satisfaction curve) becomes nearly horizontal—on our dissipation model, effectively-identical goods can continue, *each*, to have the same value indefinitely. How so? Because of the *bumpiness* of the satisfaction curve, a phenomenon not addressed in economics texts. When goods are received far enough apart in time for each to begin dissipating before the next arrives, there is a swell of happiness at each rise as well as a sinking sometime later. To be sure, this swell is smaller than it would have been had it been the first good received, but it need not be unsubstantial. Other things being equal, the further apart the goods are spaced in time, the bumpier is the cumulative satisfaction curve they yield...until, when there is *no* overlap between the anticipation and dissipation phases of successive goods, that "bumpiness" is simply the swell of one discreet wave after another, with no greater degree of satisfaction felt than would be felt from a single good as though it were the first.

Whatever the absolute degree of satisfaction desired, great or small, *smoothness* in the satisfaction curve is achieved by frequently receiving small, enjoyable-to-anticipate and slow-to-dissipate goods. Is this smoothness a good thing or a bad thing? Enter temperament. Some people like to snack all day to prevent the slightest pangs of hunger; others like to eat one big meal and get "good-'n-hungry" in between. *Average* satisfaction is the same in both cases. Similarly, some people need to receive frequent, if small, tokens of esteem to feel sufficiently

admired, while others prefer occasional but significant acts of recognition of their merit. Some people need constant reassurance in order to feel confident, while others require only an occasional indication of our faith in them. Which combination of size and frequency one prefers depends on one's capacity, on the one hand, for enjoying anticipation itself, and, on the other, for holding on to satisfaction. It also depends on one's tolerance for deprivation. All these preferences are put in place both biologically and culturally. And sometimes, of course, one has no choice. One settles for the size/frequency combination that the environment has to offer—or goes without.

The dissipation model recommends how it might be reconciled with the shortfall model. Look again at Figures 6.1 and 6.2. If the X-axis were re-named Frequency of Good Reception/Consumption, F , then, for a given good and need, each flat and horizontal *step* in Figures 6.1 and 6.2 could be taken to represent the averaged—i.e. mathematically smoothed—degree of satisfaction yielded by a long series of standardized, overlapping satisfaction waves from goods experienced at some frequency, F . The law of diminishing marginal utility then becomes an observation about the diminishing value of equal increases in the *frequency* (or "rate") of consumption of unit goods: so and so many tomatoes per month, so and so many compliments per day.

And perhaps if we looked closely enough at the underlying neurological facts we would find that the satisfaction provided by a single good—one tomato, one compliment—actually consists not of a block or single wave of satisfaction, but of *trains* of small wavelets, trills. From introspection the idea seems plausible. Over the first few weeks of owning a new car, say, does one not almost *feel* these trains of wavelets passing through? Does their internal frequency, does their duration, does their between-train frequency not decrease?

Is it not the same with newlyweds?²⁷

The shortfall and dissipation models compared.

Mathematical models of psychological phenomena always leave something to be desired. They are rarely complex enough. And such is people's skepticism—not to say fear, not to say guilt...—about the whole enterprise of "scientizing" feeling, that even researchers have limited patience for pursuing mathematical models to the ends they suggest. In our case for example, we

know that the shape and length of the phases of the satisfaction wave of a particular good are probably not stable over time. For one, the persistence of a "dose" of satisfaction probably varies with the frequency of reception/consumption, as would the intensity of our pleasure-in-anticipation. We *savor* goods that are rare and dismiss or forget more quickly those that are routine.²⁸ The same would be true of anticipation. We have not modeled any of this. Then, too, some goods and tokens begin in *dissatisfaction*, in negative *S*, and only later rise above the zero mark. Here pain precedes pleasure, and is sometimes even preconditional to it. These pain-before-pleasure waves accumulate in interesting ways, constituting essentially the *inverse* pattern of the satisfaction provided by the addictive goods (which we actually will look at some more). I have also remarked upon, but have not modeled, how *surfeit* can bring unhappiness, that is, that how one can overshoot an optimum with overconsumption.

At any rate, these limitation admitted, we still have in hand two lightly-mathematical yet useful models of how the satisfaction provided by goods mounts over time and with repetition of consumption: the shortfall model and the dissipation model.

The dissipation model is non-teleological: it involves no ideal state of satisfaction towards which we must work and relative to which we must feel less than fully realized. By contrast, the shortfall model *is* teleological in just this sense. By different routes, however, both models arrive at the law of diminishing marginal utility. The dissipation model accounts for the law of diminishing marginal utility as the consequence of attempting to accumulate dissipating goods, like filling a leaking barrel or scrambling up a hill of sand; the shortfall model explains the law more conventionally as the consequence of the waning urgency of our desire as the fulfillment of an ideal approaches.

Just as the law of diminishing marginal utility historically has helped to explain the low value of vital yet abundant goods such as fresh air and water, so, in the psychological economy, do both of our models explain the low value of easily manufactured tokens such as smiley buttons, "hi, howarya's," and automatic politenesses of all sorts, as well as the low value of the routine confirmations of legitimacy, security, and survival that, in peace time, make up everyday life.

But our models differ from one another phenomenologically, and they call upon two quite-different psychological processes to generate two quite-different philosophical outlooks on life.

Operating exclusively on the shortfall model makes us especially vulnerable to the nature of our ends and purposes. Many of these ends, on approach, turn out to be chimerical. For example, images put forward by advertising of the complete satisfaction attainable just by buying X turn out to be just that...images, impossible to attain, and fabrications anyway. Ambitions to succeed in some official capacity, or to be "great" at some activity, often turn out to require much more from us than first imagined: new pre-conditions rear up, new options and complications. If our ends turn out to be like proverbial carrots on sticks, the effort and attention required to reach them both exhausts and wizens us. Other ends, other ideals, turn out to be too easy to reach, and we quickly loses interest in them.

The dissipation model, on the other hand, is passive with respect to ends: it knows only that *this* is good and *more* of it is better. Consumption continues until the improvement in our level of satisfaction is no longer worth the effort of obtaining more and some *other* good, sampled perhaps by accident, proves more gratifying. Ah! We move on, heads down, to greener pastures, where the frequency of reception might be lower but peaks of satisfaction are higher and/or longer lasting.

In everyday life, no doubt, both models of valuation—shortfall and dissipation—are employed, depending on the particular need stratum, token type, or good in question. And, no doubt, temperament, custom, and habits incline individuals to use one more often than the other. It is of some consolation to the theoretician, then, that he often can afford *not* to know which principle of valuation is being used: the law of diminishing marginal utility seems to describe the outcome either way.²⁹

Until it doesn't...as we shall see later in this chapter.

The immediacy effect.

Using the dissipation model: consider deciding which of two goods to accept, A or B. Both apply to the same need. Furthermore, both would provide the same peak levels and total amounts of satisfaction (which is the area under the wave). They differ only in the shape of their waves. Specifically, A will peak *sooner* than B. We can illustrate this by making the satisfaction wave of A be the mirror image (in time) of the satisfaction wave B, as in Figure 6.5.

Figure 6.5 Two goods with mirror-image satisfaction waves

Empirical research by George Ainslie and others has shown that if the satisfaction of A peaks earlier than B, as it does in Figure 6.5, the overwhelming majority of people at time $T = 0$ would choose A over B.³⁰ They would choose A even if the dissipation phase of B were as extended as that of A's and the total satisfaction B provided was therefore that much greater. Moreover, they would choose A even if the *peak* of B were several times larger A's. And they would choose A even if negative satisfaction were sure to result in the long term from consuming it! Call all this *the immediacy effect*. Can the immediacy effect be rational?

It certainly seems to be a fact of human nature that we discount rewards promised for future dates, even guaranteed ones. We are, by disposition it seems, short-term thinkers. For most of us a bird in the hand *is* worth two in the bush. And yet many psychological and social disorders arise from the immediacy effect—disorders ranging from diet-breaking and the inability to save money, to drug addiction, alcoholism, and compulsive gambling; from expediency in social policy making, to impatience with education, to inflation. It requires continual admonition from the wise for us to resist our natural inclination to favor immediate pleasures over distant ones, to incline us towards investing, waiting, enjoying anticipation, and appreciating what we already have.

The importance of the immediacy effect was not lost on economic philosophers of the past. John Stuart Mill in 1871:

Men often, from infirmity of character, make their election for the nearer good, though they know it to be less valuable; and this no less than when the choice is between two bodily pleasures than when it is between bodily and mental.³¹

A. C. Pigou in 1920:

People distribute their resources between the present, the near future, and the remote future on the basis of wholly irrational preferences. When they have a choice between two satisfactions, they will not necessarily choose the larger of the two, but will often devote themselves to producing or obtaining a small one now in preference to a much larger one some years hence.³²

Well, why *are* we so impatient? Again, is it irrational? Several explanations have been offered for what we are calling the immediacy effect. Because we are deeply interested in value, we must be more-than-usually interested in how valuation is distorted—or is *apparently* distorted—by temporal considerations. Can our shortfall and dissipations models help? Or the evolutionary perspectives we have developed?

I shall present five overlapping explanations of the immediacy effect, and offer some brief discussion on each.

Explanation 1: Because the future is always uncertain. Anything might happen between now and then to rob us of the larger reward, so take what you can get right now.

Discussion: Although this is good advice when circumstances are volatile, such as during war or civil unrest, and although it leads nicely into the rational argument that the degree of discounting of future rewards ought to be proportional to delay between the time of choice and the reception of the expected satisfaction, this explanation posits insecurity and mistrust as a constant of human nature even when insecurity and mistrust are not warranted. In the experiments run by Ainslee, for example, all later-and-greater rewards were absolutely guaranteed, and people still chose the sooner-and-smaller rewards.

We know that animals as dumb as pigeons and as smart as pigs choose immediate gratification too; and so one wonders whether the immediacy effect is instinctual and, like all instincts, evolutionary adaptive. Does Nature know that reflectiveness, rationality, the ability to make plans and have regrets and so forth, has its limits? These ruminative processes take *time* after all, no matter how smart the creature, and that time can be precious given the reality and urgency of the present situation. When we choose rewards which, in their immediacy, block out considerations of the future, it could be our "animal natures" that we are responding to. Do we not feel slightly out of control when we make choices we know are against our long-term better judgments? The devil doesn't make us do it; it's the pig and pigeon inside us that does—a behavior that for the greater part of evolutionary history has been useful.

Explanation 2: Just as it makes sense to act promptly in the face of clear and present danger, so it makes sense to act promptly in the face of "clear and present pleasure."

Discussion: This second explanation builds on the first. It points out a symmetry which may well run deep in our psyches, to wit: when pleasure *or* pain seem proximate and inevitable, *act*, regardless. The problem, of course, is that whereas acting quickly to avoid imminent danger or pain is nearly always a good idea, acting quickly to secure a satisfaction often is not. Eating a slice of chocolate cake—a "clear and present pleasure" to be sure—will ruin your diet and maybe your self-estimation. A hurtful remark, no matter how true and clever and satisfying to deliver, can weaken a relationship forever. Moreover, a clear and present pleasure is sometimes the bait of a trap set by others.

There are situations, however, in which the act of avoiding a clear and present danger and the act of enjoying a clear and present pleasure *are one and the same act*. Oh, happy day! It happens most often when the level of *necessary* satisfaction is near. After all, no meal is as tasty as one eaten close to starvation, no shower as refreshing as one taken after a hot and sweaty ordeal. Indeed, the immense value of experiences garnered close to the brink of disaster motivates whole modes of cultural activity: extreme sports, car racing, hunting, adventure travel, all ascetic "back to basics" movements as well as all varieties of militant survivalism and some criminal activities...not to mention all the books, television shows, and movies that allow us to experience such high-value, borderline activities vicariously, in every need-stratum, from survival through legitimacy to freedom. When pleasure conjoins with necessity—when we *must* break the law, when we "better have" a drink, when we *must* tell off an adversary or knock down an opponent, when we *must* eat ice cream (as kids recovering from tonsilectomy "must")—lack of concern for consequences is now rational, and what usually might be indulgences can be engaged in without guilt. No wonder the sports and entertainment industry thrive on constructing such situations for us to enjoy. No wonder people say "I *need* x" instead of "I would *like* x" to provoke others into action.

Explanation 3: Because we actually prefer pleasure to satisfaction.

Discussion: This explanation only makes sense using our restricted definitions of pleasure and happiness; to wit, happiness is change-of-satisfaction (i.e., $H = \Delta S$), and pleasure is the *rate* of change of satisfaction or the "time-intensity" of happiness; i.e., $\text{pleasure} = \Delta S / \Delta T = H / \Delta T$.³³

We have not used pleasure as a significant variable up this point. We have let happiness do all the work. Now we must consider pleasure in its own right—and we will need do so again, later in this chapter, when we look at a theory of addiction.

A bit more about pleasure: Pleasure can conveniently be represented on a satisfaction wave graph like Figure 6.3 if we let the time interval over which we measure change in satisfaction, ΔT , become very small. Then the amount of pleasure felt at any point in time is indicated by the *slope* of the satisfaction wave at that time. Positive pleasure is felt if the tangent to the satisfaction curve inclines upward to the right, more as it is steeper, and negative pleasure—or *displeasure*—is felt if the tangent inclines downward to the right, more as it is steeper. Figure 6.6 plots the pleasure wave that corresponds to the satisfaction wave shown in Figure 6.3.

Figure 6.6 A satisfaction wave and its corresponding "pleasure wave"

We can now proceed with Explanation 3 for the immediacy effect. In Figure 6.5 we looked at two satisfaction waves whose shape were mirror-imaged so that the area underneath them was sure to be the same (meaning: so that we can say that they deliver the same total satisfaction over the whole period of time of the wave). Let us do the same with their associated pleasure waves. From Figure 6.7 (which uses the wave illustrated in Figure 6.6), we see that whereas the satisfaction wave is mirror imaged left for right, the pleasure wave is mirror imaged *and inverted vertically*.

Figure 6.7 Mirror image of the satisfaction wave of Figure 6.7, and its corresponding "pleasure wave"

The feeling of pleasure yielded by the first satisfaction wave (Figure 6.6) peaks high and immediately. The feeling of displeasure, though extended, is mild by comparison and easy to neutralize with the anticipation of another good. By contrast, the feeling of pleasure produced by the second satisfaction wave, Figure 6.7, is slow-in-coming and mild. It peaks low and then drops steeply to into negative territory before coming back to zero. This deep displeasure is hard to neutralize with another good unless it produces a wave like one in Figure 6.6 and is quite precisely timed.

Now, while it is mathematically true that any satisfaction wave that starts and ends with S equal to zero has a corresponding pleasure wave whose *total* yield of pleasure is zero (total pleasure being represented by the area between the pleasure curve and the pleasure = zero axis, above it counted as positive and below it as negative), it seems *not* to be true psychologically. In the rough and tumble of life, great pleasure and great displeasure are both amplified while small degrees of either are discounted or dismissed. Think, then, of only the *peaks* of Figure 6.6 and 6.7 (the latter "peak" being a deep trough), and, if pleasure alone is the measure, it become clear which one wins. The good that produces satisfaction and pleasure waves like the ones in Figure 6.6 (and A in Figure 6.5) will be preferred to the good that produces the waves of Figure 6.7 (and B of Figure 6.5). That is, choosing an immediate over a long-term satisfaction of the same total magnitude could merely be the choosing of pleasure as such—the *rush* of it—over satisfaction as the dominant measure of value.

If this is true, then one ought to be able to verify it experimentally. In an experiment set up as in Figure 6.8, people choose option C over D. Most people would choose to receive \$100 in the next few minutes over the guarantee of receiving \$120 tomorrow. This is the immediacy effect in action.³⁴

Figure 6.8 Four satisfaction waves judged at $T = 0$, C preferred to D, F preferred to E

But—and here is the test we are really looking for—they will also choose the guarantee of \$120 two weeks from now over the guarantee of \$100 thirteen days from now. There is still exactly a one-day difference in the timing of two rewards, but now the decision goes against the smaller, earlier reward, as it rationally should. To see why in our terms, look at the very minimal difference between the slopes of the anticipation phases of the two curves of the later rewards, E and F. They offer almost the same, and very low, degree of immediate pleasure. Since these subtle feelings are easily dismissed, the immediacy effect is neutralized and rationality can enter: the objective size of the final reward comes into play, and F (\$120) is preferred to E (\$100).³⁵

Explanation 4: *Since I am not now the person that I will be in the future, I may not even want the later reward by then.*

Discussion: The reasoning here is similar to that offered by Explanation 1 and it leads to Explanation 5 below. The philosopher Derek Parfit has taken this argument farthest in the effort to explain why it is that we do things now that we *know* will harm us in the long run.

In brief, Parfit's answer is this: that personal identity issues from immediate experience only, and that "we" each, therefore, are discontinuous with the past people we have been and the future people we shall become.³⁶ To the smoker who lights up a cigarette now, the person who will very likely die of lung cancer *is not he* but someone else with his name. His future self is, at best, a distant relative or acquaintance and therefore appropriately set in some distant circle of concern from his present, *true* self. On such assumptions, shortsightedness becomes rational, even necessary. It becomes a form of self-interest, where the self itself is seen as discontinuous in *time*, like two people in space, and the person "first served" is the person "first come."

Parfit's intriguing philosophical explanation seems to many, however, to fly in the face of the ordinary people's belief in the continuity and integrity of their personal identity in all but the longest of runs—say, twenty years or more. If, on the one hand, keeping date-books and diaries, leaving notes for ourselves, and making to-do lists shows *some* lack of trust in our future self, then, on the other hand, saving money, pondering whether to accept new responsibilities, or making decisions based on the likelihood of regretting them in the future...all show that *some* continuity of one's identity is assumed, too. Insofar as *any* change-in-identity-over-time supports Parfit's claim that "we" are different people at every moment, though, we must take notice. After all, I no longer pine for what I wanted so badly as a child: that bow and arrow, that radio-controlled sailboat, and I am fairly sure that by next year many of the things I now want will have been replaced by other things, whether or not I get the ones I want now.

But over a wide variety of experiments Ainslie and his associates have found that future rewards, only hours or days away, are commonly discounted at rates much higher than 50 percent, this without any indication that subjects are thinking about future selves who might by then have significantly different preferences. On Parfit's model too, the immediacy effect should be much weakened in when using perfectly fungible goods such as *money* as the reward. After all, I can be sure that money will have positive value to me whoever "I" will happen to be in the

future, even taking price inflation into account. But the degree of discounting discovered far exceeds rational corrections made for inflation over the test period, or corrections made for uncertainty, since the delayed reward in these experiments was guaranteed.³⁷

Parfit must be wrong.

Then again, perhaps all this proves is that I do not care very much in the first place to make that no-good third cousin of mine—the fellow who will go by my name and look like me but older—any richer, healthier, or happier. Especially if it costs *me* anything!³⁸

Explanation 5. Since time spent alive has intrinsic value and is limited in availability, future rewards have to be worth more than present ones just in order to cause us to wait for them.

Discussion: Unlike animals, we know we are going to die, and probably before we are ninety years old. It follows that every hour and every day that we are alive is an hour and a day subtracted from a total that has, in some sense, been allotted. This makes it reasonable to think of the time-remaining in one's life as a finite resource, something not to be squandered, especially as it approaches exhaustion. For this reason, future satisfactions, judged *now*, are not so much discounted (which is Explanation 4) as they are *held to a higher standard*.³⁹ What is good enough for me now will not be good enough for me in the future, and so future goods have to be that much bigger and better to cause me to forgo present ones for their sake.

One way to describe this logic in terms of our theory is to have the inwardly-set threshold of “enough” satisfaction (see Figure 6.2) rise steadily over time rather than stay level. Figure 6.9 shows this argument and its result graphically: wave G is preferred to wave H, even though they are objectively equal in provision of satisfaction. G provides more satisfaction *above* what will be regarded as “enough” than does H.⁴⁰

Figure 6.9 How rising standards of enough satisfaction incline us towards choosing the sooner of two identical goods

One might object that considerations of mortality are too subtle, not to say rare, to explain the very robust short-term effects of immediacy-of-reward upon choice behavior. This would be a valid objection—until and unless one took into account the very large number of

situations which are structured as *deadlines*, in mimicry of the ultimate deadline that is our actual death. When deadlines approach, the level of satisfaction we will regard as "enough" can ramp up steeply. Indeed, most rational choice experiments are structured implicitly by the deadline that is the length of the experiment itself—be it an hour, a day, or a few weeks. Life is not so different. Spend a few moments thinking on the matter and one gains a fuller appreciation of how hard it can be for older people whose capacities have not diminished to reconcile the increasing value of their remaining time-alive to them—and its decreasing value, all too often, to others. "Youth is wasted on the young," they sigh. But there is some logic to it: the time the young fritter away is but a small percentage of the time that is still due them.

This concludes our survey of explanations for the immediacy effect. Each could be elaborated further. Explanation 5, though, sets us to thinking about our larger theory of value in a way that will provide some deeper insight.

What is a "lifetime?" We speak of the lifetime of animals and of machines—15 years for a dog, 200 for a tortoise, 3 for a toaster. A long lifetime for a man or woman (nowadays) is around 85 years. These interpretations of "lifetime" all emphasize the duration component—the *how-long* of being alive, or, in the case of a machine, of being functional. They are really statements about *lifespan*. Let us be more precise. Let us have *lifespan* refer to the whole life of a person, animal, or thing—birth to death, date-of-manufacture to being junked, of incept to expiry—and let us have *lifetime* refer to the duration-to-the-present, that is, the how-long of being-alive/functional/effective *up till now*. Thus, in whatever time unit, lifetime is always less than or equal to lifespan.

What we still want is a word that describes not just the length of *time* that someone, "P", has been alive (or that an inanimate object has been whole or functional), but that captures also the total fullness or intensity of that life to date. I propose the word *plenitude*: as in "the plenitude of P's life." The plenitude of P's life would be P's moment-by-moment *lifeliness*, Ω , *summed over* P's lifetime (i.e. life to date). Only on the assumption that the fullness or intensity of life—which in earlier chapters we have called *lifeliness* and have identified with both satisfaction, *S*, and complexity-and-organization, Ω —is unvarying, would the desire to increase the *plenitude* of our lives and the desire to extend our *lifespan* amount to the same thing.

Figure 6.10 Ω , plenitude, lifetime, and lifespan (Ω curves hypothetical).

One might visualize plenitude as the shaded area under the heavy line in Figure 6.10, a line which depicts the changing magnitude of total Ω (or S) over the lifespan of a living creature. Note that from birth to death plenitude increases—if sometimes more quickly and sometimes more slowly as Ω rises or falls.⁴¹ By the same token, as time goes by, "plenitude-remaining" decreases. Draw a vertical line anywhere on the X-axis representing the present time, t . At t , the measure "plenitude-remaining" is uncertain. This is because both the total length of one's life—one's lifespan—cannot be known with certainty, and nor can its future quality be known. Because of that dual uncertainty, plenitude-remaining is subject to optimism, pessimism, and various assumptions of normality. The shaded line shown in Figure 6.10 represents optimism.⁴²

The concept of plenitude makes meaningful the proverbial equivalence of a "short and happy" life and a long and less happy one. That is, it makes sense of why some people choose to live intensely, dangerously, ambitiously, at the risk of shortening their lives, and why others do the opposite, leading lives that are as quiet, healthy, and safe as they can manage. The plenitudes of their lives could be equal. Inborn temperament is a factor in which kind of life one chooses, of course, but, broadly speaking, those that choose the first tend to be younger than those who choose the second. Indeed, most people change from one attitude to the other as they grow older, a fact that is reflected also in the financial investment advice given by professionals: higher risk portfolios when young, lower risk when approaching retirement.

Seeing plenitude as *lifeliness* integrated over lifetime also helps us understand why goods that give evidence of the dedication of plenitude to their design or manufacture are more valued than those that do not; and it helps us see why goods that in their reception or consumption confer plenitude upon *us* have more value than those that do not. At either juncture, the intensity component of plenitude might be doing the work, or the duration component might be, or both together.⁴³

The increase/decrease of plenitude also underlies all the explanations of the immediacy effect, 1 through 5. After all, if plenitude (rather than lifespan) is the real locus of intrinsic value, then why *not* try to condense life by choosing immediate pleasures over distant ones in the face of uncertainty over one's life's length? Why not live in the present, mining experience for all its worth? Why be spurred on *or* demoralized by the thought of one's life's approaching end?⁴⁴

With plenitude as life's goal, one can see why a society that has successfully increased the (healthy) lifespan of most of its citizens to beyond the age at which people are economically useful as workers or efficient as need-satisfiers, would propound a form of *hedonism*. This hedonism would elevate individual freedom to being the supreme good, along with the having of sensory pleasures and "experiences." That so many retirees in America identify "not feeling needed" as the main source of dissatisfaction with their lives attests to the incompleteness of this individualist-hedonist project. Satisfying other people's needs directly or contributing to a larger good *at some price to oneself* are activities that seem to remain essential to human happiness throughout adult life. No return to childhood seems possible. Freedom, to be enjoyed, must be earned again and again.

Whether the concept of plenitude is helpful in analyzing specific situations depends, of course, on the feasibility of measuring the lifefulness of a stretch of actual living with some objectivity. This is not easy.⁴⁵ One way to get at it, though, is to judge people's *satisfaction* by watching their actual behavior. Another is to simply ask them how satisfied they are (a) at the moment, (b) with their lives so far, (c) with their prospects. When it comes to making important decisions, most people get by on little more than rough answers to these questions themselves, the two main complicating factors being consideration of other people's happiness and uncertainty about the appropriate timespan on either side of the present to consider. Only scientists want more precision than this—and businessmen, who have the value-measure called money to make the task easier and whole-population statistics to measure risk.

Satisfaction swells and subsides with time. Happiness comes and goes with the change. Satisfaction's correlate, I have argued—and lifefulness's correlate too—is complexity-and-organization, Ω . Ω can be measured precisely enough to please the scientist (and businessman) in us, but only in situations where the probabilities of a finite number of alternative possibilities can be assessed with confidence. In all other situations, we must rely on self-report and on clever psychological/behavioral "instruments" to measure Ω and S , and money.

Nevertheless, at the theoretical level, we know this: that time is "always already" implicated in Ω because Ω involves the calculation of probabilities over changing numbers of possibilities. Ω is 'always already' a measure of the busyness of things, their vitality, an aspect of their ongoing and perhaps unchanging character but as sustained by the interaction of variable flows

of material, energy, and information through them. Ω measures the height of a *fountain*, as it were, not the height of a *statue*. Ω is a statistic emergent from a *process*, not a simple physical dimension.⁴⁶ Living things positively *hum* with complexity-and-organization even when they are apparently doing nothing and going nowhere. It is in their every organ at every scale. Multiply the Ω of this humming—which, listened to closely, is music—by the total time spent humming, and you get plenitude, the conservation and increase of which is the source of all value.⁴⁷

III. Value and Satisfaction Across Many Needs

Up till now we have modeled satisfaction, S , one need at a time. Let us now consider *total satisfaction* across all needs (at a certain time), S , or "S-bold." Given everything we have observed about the dynamics of stratigraphy—how lower needs "trump" higher ones, and so forth—here is one plausible formulation of S

$$S = S_{\text{survival}}(1 + S_{\text{security}}(1 + S_{\text{legitimacy}}(1 + S_{\text{approval}}(1 + S_{\text{confidence}}(1 + S_{\text{freedom}}))))))$$

This expression might be long, but it is actually quite simple. To get the feel of it, let us group survival, security, and legitimacy needs together and call them, collectively, our *lower needs*, as we did in Chapter Five. Then let us group approval, confidence, and freedom together and call them our *higher needs*, as we did there too. The long formula for S then boils down to one we can follow quite easily, and that is emblematic of any two adjacent needs. To wit:

$$S = S_{\text{lower needs}}(1 + S_{\text{higher needs}})$$

We notice immediately that if $S_{\text{higher needs}}$ goes to zero, then S is still equal to $S_{\text{lower needs}}$, whatever it may be. But if $S_{\text{lower needs}}$ goes to zero...well, we are torpedoed: S goes to zero regardless of what $S_{\text{higher needs}}$ might be. In the first, long, expression for S , this kind of relation holds between any two adjacent needs. In general and over all, S is more sensitive to changes in satisfaction in the lower need(s) than to changes in satisfaction in the higher need(s).⁴⁸ This is

what the "multiple-nestedness" of our formula for S instates. In doing so it embodies both our stratigraphy's precession principle and Maslow's hierarchy-of-needs pre-potency principle quite nicely.

It does not, however, question whether "levels of satisfaction" can be added to or be multiplied by each other, that is, whether arithmetic can be done at all. This will remain a problem for us—but no more of a problem than it is for all of economic theory using "utility" as a *explanans*, and, indeed, for all of experimental psychology using algebra to help model human experience. The real question is whether such models enhance and extend our intuition. The real question is whether they work.

For example, we might fairly wonder whether we actually have access to our feelings of satisfaction *vis a vis* any single need in the first place. For the purposes of exposition, I have assumed that we do: I have assumed that we can *know* our satisfaction levels, need by need, in pretty much the same way we can know the present dollar balances in several accounts at the bank. But this might not be the case. It might be that we only have ready access to S —as though our bank statement showed only our *total* dollar holdings. If this were the case, then the precise manner in which single-need satisfaction levels "add up," or what those levels actually were at any moment, would seem to be a moot point and all the formulas we have been using entirely academic.

But I would suggest that a certain opacity can remain between us and the balances in our various "need accounts" and we can still get by. I suggest that we can (and perhaps do) manage quite well by registering only total satisfaction, S , with any exactness, because from simply living in the world and paying attention to how particular goods promising particular-need satisfactions affect S we can *infer* the machinery of the right hand side of the equation for S (and our "balances" there), and come to act *as though* we had direct access to the quantities S_{survival} , S_{security} , ..., S_{freedom} . Would this be some great intellectual feat? Not at all. We have no clear idea how we catch balls or ride bicycles either. Indeed, the computations we actually operationalize might be more refined and detailed by far than the what I have written out for the right hand side of the equation for S , which would then not so much be *wrong* as be a cartoon, capturing a likeness. Such is the nature of theory.⁴⁹

Be this as it may, and whether or not we have an accurate picture of each need and its state of satisfaction, it is clear that the value of a good directed at satisfying need i is *not* the

change in S_i it occasions, as I have been asserting up to now, but, rather, the change in S it occasions, as Menger had it. We were able to theorize reasonably about the value of goods that satisfied just one need on the assumption that the degree of satisfaction of all the other five needs remained constant. As long as we hold to this assumption, Figures 6.1 through 6.9 still work, as do all the arguments they illustrate. Indeed, we can go so far as to imagine that it was S we were discussing all along. In doing so we would want to notice this consequence: that because value is tied to the change in total satisfaction over six needs and not one, happiness does not (often) plunge and soar quite the way it would if we had only one need in the first place. S , as a measure, has greater "inertia" than any single S .⁵⁰ When the value of a good or token surprises us, it is often from the volatility of S (or lack of it) that we get a clue as to what specific needs were actually being served or exacerbated. (Are we not sometimes surprised at the irrationally strong effect certain tokens have on us? It's probably because the need it *actually* addresses lies deeper than the one it officially addresses.) Also, because the important question is "does S increase?" rather than "does each and every S increase," we can see how rational it is to risk—and even suffer—a degree of *dissatisfaction* of one need in order to satisfy another more.

Increasing the magnification of our analytical microscope just another click reveals more to give us confidence in our model:

Ideally, it is only after the lower of two needs is satisfied *enough* that the next higher one comes forward. This done, working towards the satisfaction of the next-higher need offers us the most happiness, and any action or event or good that is instrumental to that happiness will, in the offing, seem to have greater value than it did before and/or greater value than most.⁵¹ But here is the problem: people often find themselves in situations where the goods (or tokens or services) needed to satisfy a given need are simply not available whereas those that might satisfy another need are, and at a "good price." It would be irrational under these circumstances *not* to get what satisfaction one could, even though S could not move up very much, and even though doing so might cause an imbalance in one's need-state.

By "need-state" let us mean the ensemble of levels-of-satisfaction of all six needs at a given time, expressed by the vector $\{S_1, S_2, S_3, S_4, S_5, S_6\}$, where "1" is survival and "6" is freedom. Many different need-states can deliver the same magnitude of S . A *balanced* need-state, however, is one in which $S_1 \geq S_2 \geq S_3 \geq S_4 \geq S_5 \geq S_6$. In this state, S is maximized (for a

given arithmetic sum of S_i , $i = 1, 2, \dots, 6$) and the volatility of S —its sensitivity to up and down movement—is minimized. The satisfaction of every need is "well founded."⁵²

Now, an *imbalanced* need-state—by which I mean a state in which one's lower needs are less completely met than one's higher needs—is acceptable if it is temporary. After all, in the course of a day, a week, a month, new situations can arise that will fill the void, that will salve the ache. Indeed, given the urgency of unmet lower needs it is not unusual for us to seek out such reparative situations. But what if they do not arise or cannot be found? What if, for reasons that might include pathology, certain lower needs remain unsatisfied for long periods of time while higher ones are satisfied? We all know of individuals who are in just such a situation: on the one hand they receive a great deal of approval from others, but on the other, they block from consideration—their own consideration as well as others' consideration—their still-urgent need for legitimacy.⁵³ Pay attention to their behavior and you will notice the imbalance taking its toll. Many of them suffer from "the imposter syndrome," i.e., the uneasy feeling that for all the adulation they receive they are not genuinely—"by rights," *legitimately*—who or what people take them to be. The fear of it being discovered that they did not graduate from Harvard, that their medal was for someone else's bravery, that their father was bigamist, and so on, remains a constant drag on their happiness. Because neither the confidence they show nor the freedom they (apparently) enjoy is well-founded, they cannot, as the French say, be "comfortable in their skins."

Worse off yet are well-liked, confident, and highly credentialed people who for one reason or another do not feel very *secure*. Since it does not take much for others to capitalize upon this vulnerability, such people tend to act defensively and preemptively to cover up the continuing urgency of this lower need. If the reasons for their insecurity are not real, we call them "paranoid;" but whether or not their reasons for feeling insecure are real, insecure people are apt to break all kinds of social rules in order to attend to their still-urgent need. And they are often attracted to using the force associated with security, i.e., *power*.⁵⁴ Indeed, I would suggest that, contrary to accepted criminological wisdom, habitual criminals do not so much suffer from a *lack* of self-esteem (self-approval) as from *an excess* of self-esteem *poorly founded*. That such individuals readily resort to coercion—to authority, power, and violence—only confirms that their need-state is fragile and that the fragility is coming from insufficient satisfaction levels at the lower strata.⁵⁵

A journalist for *Le Monde* (this was not a scientific study) interviewed a large number of former hijacking victims about their experience during and after. He found an unusually high number of divorces in married couples among the victims years after. It would seem that the stress of the situation had brought out the worst in many.

Most interviewees (reported) that they had never contemplated a divorce before the hijack. During the horrifying episode, however, “their eyes opened,” and “they saw their partners in a new light.” Ordinary good husbands “proved to be” selfish creatures...; daring businessmen displayed disgusting cowardice; resourceful “men of the world” fell to pieces and did little except bewail their imminent perdition.⁵⁶

The question raised is: were these people—these men—always and already cowards? Had dire circumstances revealed their true nature? When people act in selfish, violent, or cowardly ways under extreme duress, are all their good actions—their manners, their charity, their courage in normal, everyday life—thus nullified? Do people have “true natures” underlying appearances, natures that are revealed when the layers of civilization are stripped back? These are deep questions for ethics. Our theory suggests that nothing more or less special has happened than that upper level need-satisfaction has been reduced to near zero. People—*all* people—can be reduced to operating at the lowest level of the stratigraphy if their entire environment—the place, behavior, law—conspires to frustrate progress up the stratigraphy. Heroes and martyrs are notable for how doggedly they resist such reduction, for how well they cling to patterns of behavior indexed to higher levels of the stratigraphy, but there is no way to predict from social or economic profiling who will be hero or martyr when it really comes down to it and the lower needs are in charge and coercion is the only force in operation.⁵⁷

Imbalanced need-states also characterize people who like living close to the edge—people who prefer, or need, large motions of *S* in order to feel as much as others would with much smaller motions of *S*: I mean risk-takers, adventure-seekers, believers that God takes care of them and will reward and punish mightily, and so forth. They *must* have the large swings in *S* associated with dealings in the lower needs or they don't feel alive. (The rest of us go to the movies to feel the same thing, but safely.)

Imbalance need-states also characterize a state of mind common in countries whose legitimacy structures have broken down or have become corrupted. In post-communist Eastern Europe in the 1990s, for example, with pensions, sick leave, medical plans, and government jobs

gone and a justice system more *just*, perhaps, but weakened in execution, nothing *but* freedom was won. But this freedom was, and in large part still is, unfounded freedom—the freedom of the con-artist and thug to make a quick buck by whatever means necessary, the freedom to look out only for oneself, this while the greater part of the population consoled itself that voting for alternative politicians—another new freedom—would make a difference.⁵⁸

Akasia: weakness of will

We have already discussed how certain temptations—situations in which we find ourselves irresistibly drawn into acting against our better judgment—are given rise to by the "immediacy effect." We eat unhealthy foods, we smoke or drink too much, we act impulsively and so forth, all to our later and predictable regret. But there are harder cases, matters less of *impulsive* behavior than of *compulsive* behavior, as when we take actions that are of predictable and immediate negative value to us and/or in direct conflict with what we say we want and value. For a utilitarian such actions are a puzzle.

For example: why do we so often procrastinate knowing full well that the situation at hand calls for immediate and justifiable action? Why do we shirk the responsibilities that we know we should shoulder and that we know would be nicely rewarded? Why do we speak our minds when we know it would be better to remain silent? Why do we remain silent when we know it would be right, and even best for *us*, to speak out? Why do we betray other people's confidences, astonished at the words tumbling from our lips as though from someone else's? And there are harder cases yet. How is it that we can strike a child we dearly love, feeling *at the same moment* that it is both morally wrong to do so as well as counterproductive? Riddled with guilt, how is it that we can feel helpless to prevent escalating a casual attraction to a stranger into a full-blown, marriage-destroying love-affair, "one thing leading to another"? One thing leading to another, how do we become embroiled in political causes and interpersonal conflicts in which we had no real interest in the first place, and still don't? Why does the gambler, knowing the odds full well, play himself to ruin?

These are serious questions. The ancient Greeks identified the problem as *akrasia*, or weakness of will, and the problem of *akrasia* has bedevilled philosophers since. Clearly irrational, can it be avoided? Can it be trained out of us through education? And as though to complicate

matters, one can point to harmless and even positive examples of *akrasia*. Do we not cry at the movies even as we know only a fictional character has died? And what, after all, is courage? Courage is not the same as fearlessness. Courage is the ability to override one's perfectly rational fear; it means going forward when every fibre in one's body says to go back. It would seem that "strength of will" here depends in some way upon a failure of the will—a failure, at rate, to be unified in what one wants.

Is the difference between good *akrasia* and bad *akrasia* simply that the outcome of *good akrasia* is socially valuable and thus rewarded, as in the case of courage? After all, courageous people save *our* hides, and especially-dutiful people serve us all. And how much self-sacrifice, one wonders, is motivated by the fear of experiencing shame so large that it eclipses the fear of experiencing death? Thus does the virtue of shameability serve larger purposes. The concept of "inclusive fitness" accounts for all of this, of course—which is to say, accounts for individuals behaving in ways that are in the (reproductive) interests of the (gene-pool of) the group rather than their own (genes). But perhaps our model of satisfaction can throw a more humanistic light on the same behaviors.

Earlier I remarked that we although we might know what we want quite specifically—new shoes, to listen to some music—we might not always have access to the details of our deeper need-state through simple introspection. The proof that we sometimes *do* have such access, however, is in how often we have mixed feelings about the value of certain actions—both our own and others'. At the one and the same time we can feel happiness and sadness, pleasure and pain, pride and shame...this as different needs are simultaneously being affected, up and down, within ourselves and others for whom we care. Perhaps we are making trade-offs between our needs—more security for less freedom, or more confidence for less legitimacy, and so forth. We are happy about the *S*-motion of one need because it is positive, distressed about the *S*-motion of the other because it is negative, but on the whole feel the trade-off worthwhile because the net change in *S* is positive. Internal economics. Does not doing our duty serve our legitimacy needs (which makes feels good) and at the same time subtract from feelings of freedom (which makes us feel bad)?⁵⁹ The simple act of purchasing often puts us in two minds: happy to acquire the good we bought, and sad that we had to pay any money at all. (No wonder modern retailers have become so expert at helping us *not experience* the outflow of our money.)

Overlaid upon the immediacy effect, then, it would seem that *akrasia* could result from two further, now-familiar-to-us facts: first, that we nearly always have more than one need calling to us the same time, and, second, that perturbations of our lower needs "shake our tree"—influence *S*—more than do perturbations of our higher ones. A person's will is rarely a single, unified, force. We are constantly at war within ourselves, or if not exactly at *war*, then in constant internal dialog, commerce, and politicking. The private, inner world models itself on the outer, social one, and what we actually *do* in that outer world is often the result of a far-from-unanimous vote between constituencies in the inner world. This results in our actions being carried out over the objections of a still-vociferous "opposition" within us—with misgivings, regrets, hopes, and excuses still resounding.

So when a situation develops in which a lower, dormant need is awakened while an upper need is being negotiated, our consciousness is split in two. One half is devoted to the higher need and to providing narrative continuity to the community (which would rather not hear of anything "base" or, if it did, would exploit the weakness), while the other half attends to the lower need with all due urgency. We find ourselves in two minds. But here's the rub: in the wrestle over what to do next, the lower of the two need tends to win. Naturally "pre-potent," the lower need takes over the helm, as it were, steering our behavior towards what will satisfy it even as the rest of the crew protests or pretends it isn't happening. Such *coup d'etats* are more likely to occur when one's inner-set standards of enough satisfaction in the lower needs have been artificially lowered, say, by having adopted an ideology of asceticism that one doesn't fully believe in, or by having turned a blind eye to the tenuousness of the social arrangements one has made to provide for the satisfaction of lower needs. Many of our motivations are not so much anti-social in intent as predictably anti-social in consequence. They are thus repressed, denied. But like the truth, they will "out" and cause *akrasia*, especially when the satisfaction of lower needs is required in social contexts where they were presumed to be moot. "Weakness of will," we begin to suspect, is a weakness only when, and only because, the lower "baser" motives that dominate (as they naturally do) are unacknowledged. When the higher motives win nonetheless, or successfully seem to, win we call it *strength* of will—nobility.⁶⁰ Courage.

Incommensurability

It has been argued that *akrasia* should not, indeed could not, arise in a perfectly rational person using a single dimension of valuation. If x has more value to P than y does (and P must choose one over the other), then P cannot choose y and still be considered rational. Or, if P is rational and chooses y , then x did not *really* have more value to him—in which case the premise was false.⁶¹

Commentators on this ancient paradox (which comes to us from the Platonic dialogue *Protagoras*) find that they must choose what lessons to draw from it. Here are three. Lesson 1: since *akrasia* should not exist, we should, after due deliberation, array our options on a single dimension of value and choose the option with the highest value directly and without regret. Lesson 2: *akrasia* is real and unavoidable because the value(s) of many things are irreducibly uncertain and incommensurable—i.e. unable to be compared to each other on the same scales. Lesson 3: people are only seemingly irrational and "akrasic" because the full complexity of how they/we think cannot be plumbed.⁶²

The explanation I have offered steers a middle course between these three "lessons." It insists that there is indeed a legitimate single measure of value, which is change in total satisfaction, ΔS (which is in turn a manifestation of a deeper phenomenon called *lifeliness*, measured by Ω). It also says that we have imperfect but adequate cognitive and emotional access to this measure in ourselves and others, much aided by conventions of morality that contain, as it were, the wisdom of the species. At the same time, and *vis a vis* Lesson 2 above, it insists that the satisfaction provided by a good or token directed at, say, our need for legitimacy, cannot simply be *turned into* satisfaction of another need—say, confidence—as though we were transferring just-received money from one account at the bank to another. To satisfy our need for confidence we just have to go out and earn or elicit the tokens that will give us confidence. But, according to our view, this does not make the value of different kinds of tokens incommensurable. Different types of food all satisfy our hunger and are commensurable in their hunger-satisfying ability. But they differ too in other dimensions, like taste and nutritional value. This makes different types of food almost, but not completely, substitutable for each other—just *how* substitutable depending in good part on how close to starvation we are. The same is true for most goods. As we touched on in Chapter Four, psychological goods—tokens—that satisfy the *same* need are

almost but not completely substitutable too. Tokens that satisfy *different* needs are less substitutable (the less as the distance between the needs on the stratigraphy is larger). We also noted that the value of tokens, once internalized—once extracted, so to speak—has limited convertibility, if only because tokens keep their connection to specific people and arrangements that generated them in the outside world. They are rather like coupons that can only be redeemed at certain vendors: Although it makes sense to count how many dollars-worth of coupons one has accumulated and then to feel satisfaction (or relative dissatisfaction) at that sum, one still cannot use those coupons like money, i.e. anywhere, for anything, or freely transfer their value between one's need-accounts.⁶³ The limited substitutability and convertibility of the value of two goods or tokens (this as a function of the "distance" between the needs they address) is something our formula for S tried to capture to a first approximation. (Substitutability as a variable will appear again in our formulations of market prices in Chapter Eight.)

In summary: all *good* goods increase the plenitude of our lives. In this all-important dimension, all goods—tomato, hammer, and song—are entirely commensurable, entirely comparable. But at different scales, at different times, and in different situations they contribute to our lifefulness at the moment—or our plenitude in all—in different ways. And this makes any two goods, chosen at random, unlikely to be completely substitutable for one another. The complexity-and-organization of the world enters us as we negotiate with its possibilities and limitations. What people *do* under these circumstances might sometimes seem unenlightened, but it is nearly always rational—or once was, evolutionarily speaking. We saw this with the immediacy effect and, I think, with *akrasia*.

Before getting to the subject of exchange and the concept of "exchange value" in Chapter Seven, we must undertake to examine goods that do *not* obey the law of diminishing marginal utility. There are many. Do they challenge our theory? Do they reconfigure the normal structure of exchange? In the discussion that follows, and unless otherwise specified, total satisfaction, S , rather than the single-need satisfaction, S , will be the variable considered.

IV. Climactic and Other Satisfaction

Not all goods and not all tokens diminish in their value in accordance with the law of diminishing marginal utility. Many maintain or increase their value. Such goods are anomalies when judged by the standard utilitarian theory that undergirds modern microeconomics. I have classified them into four groups. Since (as far as I can tell) a technical vocabulary for such goods is lacking in the literature, I have grouped and named them 1 through 4 thus::

1. Climactic goods
2. Goods that Keep Giving
3. Goals that Keep Receding
4. Salted peanuts: Addictions

1. Climactic goods.

Chief among these, as the name perhaps suggests, are the goods, services (actions), and tokens associated with satisfying sexual desire. Here, compliments lead to caresses and caresses lead to more caresses, the pleasure of each exceeding that of the one before until the nervous system reaches a critical stage of excitation and orgasm—climax—results. The satisfaction achieved is considerable, if temporary: for, alas, it begins immediately to dissipate, faster, apparently, for men than for women.

How do our two models, the shortfall model and the dissipation model, describe this sort of phenomenon?

On the shortfall model, our inner-set level of *enough* satisfaction is pushed up and away with every good consumed until it surpasses S_{\max} . Instead of the shortfall decreasing with consumption, it increases. Instead of $S_{\text{new}} = S + S_{\text{first}}(1 - S)$, as is the usual case, we have $S_{\text{new}} = S + S_{\text{first}}(kS)$ where k is some constant. Under these rules, S_{first} can be very small and the result, after a short period of time, suitably cataclysmic.

The dissipation model, too, is able to provide a description in its own terms. Climactic goods are those whose rate of dissipation decreases as a function of the frequency of their reception/consumption. A similar result is obtained if the anticipation phases of successive goods lengthens as the frequency of reception/consumption increases. In neither of these two

cases need the *peak* satisfaction of each wave increase in height or its plateau increase in width, although both would certainly contribute to yet-faster runaway satisfaction. Indeed, the peak value of any one typical wave can be very modest, as can the width of its plateau.

Sex is by far not the only venue where satisfaction accumulates climactically. Climaxes and the catharses that follow them are common in everyday life. Outbursts of joy or anger, for example, are often the manifestation of self-reinforcing accumulations of satisfaction or dissatisfaction reaching some critical threshold. Political agreements and long-lived insights are often reached at breakthroughs, such breakthroughs occurring only after a "critical mass" of understanding has been reached, the result of steady or ever-increasing effort. It is as though the brain as a whole were reiterating the "integrate-and-fire" behavior of a single neuron

There is a related sort of good that causes climaxes too. I mean those goods which are typically pursued against *deadlines* (cf. p. 40). Anyone who has worked in a team towards a deadline—say, the publication of a journal or the staging of a concert or the roll-out of a new product—knows of people who hold back their efforts until near the end. Then they appear, selflessly working long hours until the task is done. Over the top. Saviours! Such last-minute contributors understand the 'mechanics of value' in such situations all too well, and are apt to profit from it.⁶⁴ Less savvy and less rewarded are those who laid the groundwork for the project in the first place, or who worked steadily all along.⁶⁵

A similar dynamic characterizes competitive sports, of course, and all the activities that modeled on sports, and games in general, that James P. Carse calls "finite games."⁶⁶ Just as the player who makes the winning touchdown in the final moments of a football game is most admired, or the army that joins the war late and helps win it for all is most congratulated, so the fifth set in a tennis match, the third genie-granted wish, the last word in a debate or the last days of campaigning in a close election, the last tickets for a concert, the punch-line of a joke, the expense at the end of the month...so all these "count" more than their earlier brethren. And just as the climber forced to turn back close to the summit cuts a more tragic figure than the climber who, perhaps more wisely, turned back earlier, so too is the salesman a sadder person who loses the sale at the last moment than the salesman who was turned down at the beginning.

Consider the (sometimes pseudo) technical sophistication reached by "high-end" sports equipment such as tennis rackets, golf clubs and balls, bicycles, fishing rods, and running shoes.

Consider the real sophistication and expense of modern weaponry. Consider the high prices that people (and governments) are willing to pay to gain the "edge" that these products give or promise, or, for that matter, the "edge" given by the services of high-priced lobbyists, trial lawyers, football quarterbacks (or baseball pitchers or basketball forwards), advertising firms, or big-college coaches. Even though the advantage *actually* given with each unit of extra sophistication and cost diminishes rapidly, when the situation is such that "winning is everything"—i.e. when the satisfaction is climactic—the law of diminishing marginal utility is mitigated if not totally reversed.⁶⁷ The auctioneer intones "going...going.....go-" and another bidder bursts forth with a higher bid, almost against his will.

The same logic applies to certain activities that are not so explicitly so contestatory, so "win-lose," in nature. The final scenes of a movie, for example, the last pages of a suspense novel, or the last element of a collection such as of stamps or art or historical documents...all of these have greater value than the first of their kind precisely because the satisfaction of whatever needs they address is construed to be climactic.⁶⁸ The "calendar effect" on stock prices is also well known, to wit, that stock prices are apt to rise the day before trading holidays, before weekends, before closing every day, at the turn of the month, at the turn of the year.⁶⁹

After considerable negotiation and agonizing one sits down, finally, to sign a lease on a new car, say, or to "close" on a house. Suddenly, substantial new charges—the seller or broker will call them "minor"—will materialize out of nowhere: new fees and extra conditions. Why? And why does the buyer accept them? Because on the threshold of *having* something one has long desired and fought for, its value is heightened, and it's a relatively simple matter for the seller-broker to boost the good's price to match. The same happens at international peace negotiations.

In the trading of land, "hold-outs"—i.e. owners of small parcels of land who, in refusing to sell, prevent consolidation of larger and more usable lots—can realize double or triple the per-square-foot prices realized by their neighbors, the ones who sold early. Their lots are mission-critical, their value "climactic."

But perhaps the preeminent contemporary example of a climactic good—and of steep prices to match—is American health care. Americans are not fatalists. No service is too elaborate and no technology too sophisticated to postpone that last of all deadlines, our actual deaths. The spiralling cost of health care in America is due, chiefly, neither to inefficiency in the

system nor to profiteering by doctors, insurers, or drug companies, all of whom are in no less competition for our health-care dollars than automobile manufacturers are in competition for our transportation dollars. At bottom, the high price of health care is due to the high value *we* place on avoiding the climactic dissatisfaction of dying before we are one hundred years old, not to mention the "edge" we lose if in poor health, are aging normally, have poor teeth or sagging breasts, or when better jobs, husbands, wives, awards, yachts—climactic goods, all—are at stake.⁷⁰

The high cost of health care in the U.S. is also due to individual doctors and hospitals being unwilling to risk their legitimacy, and therefore their livelihoods, should they be sued for malpractice for under-testing or under-treating their patients. In short: the needs are weighty on both sides of the exchange in the market for health—survival for legitimacy to be exact—and the satisfactions/dissatisfactions are climactic for both sides too.⁷¹

As doctors are to our survival, so lawyers are to our security and legitimacy at critical, make-or-break moments. This helps explain their fees.

One final example, far more delicate: The distribution of finishing times of a marathon race follows a bell curve, with the bulk of the runners finishing in average time. But close inspection of the curve reveals spikes just before all of the on-the-hour marks, showing how runners push themselves harder to "come in under two hours," or three or four...⁷² Deadlines and thresholds, real or imagined, are always real when it comes to valuation.

2. Goods that Keep Giving

In contrast to all the types of goods we have discussed so far, there exist goods and tokens which, once accepted, rather than dissipate, remain steady in their effect over time or even grow in the satisfaction (or misery) they give us. Without implying that they are received costlessly, I call them Goods that Keep Giving, or GKGs. GKGs fall into at least four sub-categories (and here I emphasize the psychological/informational dimension of their value):

A-type GKGs are biologically alive and/or growing in some way; for example, a pet, a plant, a piece of fertile land, a fruit tree, a rain forest, a clean river. In certain cultures a husband, a wife, a slave, a child are thought of in this way: as an ever-productive gift, or an ever-obstructive

burden as the case may be, for whom some balancing exchange has been made or promised. (With grim humor, some hard-to-completely-cure infectious diseases are called "gifts" that keep giving.)

B-type GKGs are non-living but very complex goods. Specifically, they are goods that store substantial amounts of information in them, information that depends on the materialization of certain future contexts to emerge or be useful. They contain "timed-release" information, as it were. Some examples of B-type GKGs are: an encyclopedic book or CDROM, an education, a fine building or artifact. Each of these satisfy needs as they arise over time and over a number of situations. These are goods that one *draws upon* rather than consumes. They do not themselves grow or evolve as do A-type GKGs, except *as* a type of good over many generations of redesign.

C-type GKGs are similar to the ones above, but are not in themselves dense with stored information, information one would use directly. Instead, they act as triggers, keys, access points, or vehicles for other goods. A computer connected to the Internet would be a C-type GKG. Among tokens, guarantees or deeds to land are examples: they are devised to serve as tokens of security more or less in perpetuity. Licenses, academic degrees, good family names, and letters of introduction from people of high station can do much the same thing.⁷³ "Stay Off the Grass" signs never tire of being officious and grumpy, and they even, on occasion, keep people off the grass. Monuments, flags, and statuary that stand forgotten all year come alive with significance when embraced by an annual ritual. Photographs of loved ones are constant reminders of one's priorities. Memorable maxims and slogans also fall into this category too, as do actions and events whose significance "dawns on you" much after the occasion.

D-type GKGs are themselves devices for making or evincing more goods. A useful tool or machine or weapon or piece of software, rent-producing property, interest-bearing securities, prestige-conferring tokens, saved money...all these are *capital goods* in economic parlance. Land and farm animals are both A- and D-type GKGs. GKG *tokens* can often be traded as tokens that continuously warrant what they seem to warrant—i.e. social standing, physical safety, financial freedom, etc.—to whomever receives them.

Can all such Goods that Keep Giving be described with the models we have developed? I think so. The dissipation model has an easier time of it than the shortfall model, which is not suited to the task at all. Set the dissipation rate close to zero and the frequency of

reception/consumption low. This would describe a good that, when consumed, delivered a dose of satisfaction that dwindled very slowly or not at all. Better, though, is it to think of all GKGs as unique sources of repeated episodes of satisfaction, as net producers of smaller goods, like the proverbial hats out of which rabbits pop. These rabbits are either already scrunched up in the hat (B-Type), or they are being channeled in from somewhere else (C-Type), or the hat *is* a pair of rabbits (A- and D-type). In one or more ways, all Goods that Keep Giving are capital goods, even though the goods they produce might or might not have monetary value.

3. Goals that Keep Receding.

In the shortfall model proper, maximum satisfaction can be approached but not arrived at by consuming any number of partially-satisfying goods. S_{\max} remains forever a potential, and so does S_{\max} . This is why *enough* satisfaction always lies below S_{\max} .

Now, not only is S_{\max} an impossible-to-reach ideal, but, climactic goods aside, it is a *necessarily* impossible one. It is a fiction. To abandon calculations using S_{\max} on the grounds that it is a fiction, however, is not at all realistic. It is to miss the essential role that beliefs about ideal and potential states play in our valuational lives. We imagine best- and worst-case scenarios, ultimate pleasures, and other grand totals all the time, knowing that they probably have not been experienced by anyone in real life. We refer to them anyway precisely for their orientational, limit-setting capacity.⁷⁴

Now, what about the stability of such maxima? The scope and content of S_{\max} is open to cultural influence, as is S_{\max} for every need. Even levels of *enough* satisfaction are revisable.

One feature of our consumer culture has been remarked upon to the point of being obvious: that not long after has one bought, say, a car or a house or a video-camera, one develops "eyes" for a better one, a model with more features or more class. Clubs we longed to join turn out to be full of people less admirable than we had imagined—people like ourselves (leading Groucho Marx to make his famous quip: "I wouldn't join a club that would have me as a member").

People who rise to positions of power only find that there is more power to be had. People who study a subject for a long time often feel, quite genuinely, that their ignorance has increased. What has happened? Awareness of the scope of their subject has grown faster than

their knowledge, the goal of complete understanding receding like the horizon. And just as the donkey follows the carrot dangled in front of, but always beyond him, so the romantic pursues the chimera of the perfect mate—who is always already married, or disappearing around the corner into a crowd.

The perfect home, perfect sex, perfect food, perfect love, glamour, power, freedom, financial security...descriptions of what these would constitute are adjusted at every step towards them. New goods and new experiences propose themselves as the final one—the one we've been waiting for, the one that will do the trick—and we adopt them (let us admit) half-knowing that they cannot deliver us from, but only open us to, further desire.

One important effect of all this raising-of-the-bar is to keep the average slope of the satisfaction curve beneath it positive, never allowing it to become horizontal.⁷⁵ We are always "starting out." And who does not love beginnings, full of hope? In standard microeconomic terms: marginal utility never falls to zero when the basis for its calculation is the ascending target of *enough*. In this, it is like a climactic good in slow motion, but with S_{\max} never reached. The law of diminishing marginal utility is not so much defeated or disproven as it is indefinitely postponed.

One strategy for the postponing full satisfaction we might call *re-scaling*. Here, through the paying of unusual attention to the nature of the good, the almost-horizontal tail of the satisfaction curve is re-drawn, as it were, to larger scale, emphasizing the vertical axis.

Figure 6.11 Re-scaling satisfaction to forestall diminishing value (S smoothed).

It is as though a magnifying glass were applied. Within this new and more detailed zone, progress can be made at a finer scale and with a new sensitivity to detail. At the new scale, more frequent, if smaller (S_{first}) goods are produced more frequently. The word "refinement" is appropriate here, and connoisseurship.

Into the category (of Goals that Keep Receding because of re-scaling) fall the "finishing touches" we apply to a work of art as well as the "last injustices" we might try to eliminate from some social dispensation. Typically, it takes a tremendous amount of time and effort to achieve what may seem to be rather small improvements if viewed *objectively*, i.e. by someone *not* involved, by someone who has not re-scaled satisfaction and time. As one approaches perfection,

so the task magnifies and fissionates. Complexity -and-organization, Ω , increases. Returns to effort diminish in one sense, but continue unabated to the one whose perception is adjusted to see the finer grain of achievement—and its value.⁷⁶ Quality, not quantity, becomes the watchword.

The role of critics and educators cannot be overemphasized in this arena. At the higher reaches of satisfaction, people do not automatically know how to proceed. They do not know what to want; they do not automatically know which better and finer goods would be worth pursuing. Such information comes from their culture, the role of which, as we have noted, is *cultivation*, which in turn means pushing back the frontier of potential complexity, C_{pot} , and having as many people as are able to, re-locate themselves on that frontier's position of optimal Ω . Abandon this effort...and happiness can come only from revisiting the lower needs, and the lower reaches of satisfaction of each need, and engaging the higher-value but less complex, lower- Ω , goods that are naturally traded there. A touch of evil resides in hankering for this lower- Ω way of life—and more than a touch in arranging for it to happen to others. More about this in Chapter Ten.

Some economists are beginning to talk about *qualitative* instead of *quantitative* growth as the correct course for advanced nations to take.⁷⁷ Less polluting, more sustainable, more just and more lovely in outcome, qualitative growth is a good idea. Standard economic theory, though, having grown up in another era, is ill-equipped to prescribe—let alone describe—how an economy devoted to qualitative rather than quantitative growth might thrive. Some New-Age critics of traditional economics go so far as to disparage the very use of quantification—of math, models, charts, statistics, etc.—to chart the course. To even *use* quantitative methods and theories, they fear, is to perpetuate the production- and consumption-quantity-obsessed economic system we have.⁷⁸ I do not go so far. What I hope this book is showing is that best way to appreciate what "quality" is and then to devise strategies for encouraging its production, is to understand how things are valued. Since all qualities are *quantities of something*—if only "features" or "attributes" or "effects," and if only relational, probabilistic "somethings" like Ω -at-different-scales—quantitative models can be of great help.

4. Salted Peanuts: Addictions.⁷⁹

Finally, there are goods and tokens that stimulate rather than attenuate the need for more goods and more tokens of the same type. Try eating just *one* salted peanut.

Being told things about oneself that one did not know, or did not know that other people knew, is being fed "salted peanuts:" one is generally worse off for it, and the only balm is being told even more. This kind of "addiction" is well understood by the authors of serial fictions.

It is also well understood by members of the psychological helping professions: religious guidance counselors, social-workers, psychotherapists and psychiatrists and the like. These are individuals who take up positions at critical junctures in their clients' lives, that is, times at which when they, the clients, are appraising the satisfaction they feel, S , and comparing it to the satisfaction they think they deserve and/or can achieve, S_{\max} . While the helping professions can enhance an individual's capabilities and sensitivities, while they can remove fears and re-train beliefs so as to make the individual "more fit for life," the techniques employed can also escalate what ought to have been a temporary unhappinesses into longer term, deeper dissatisfaction. In the worst cases, impossible-to-reach ideals of satisfaction are postulated (by patient or therapist): one must be perfectly free, one must loved "for oneself" (whatever that means), one must be in harmony with the Universe, etc., etc. As the patient or client's distance from such ideals is made more evident with every passing visit, as more past injuries are uncovered, more beliefs are questioned, and more rights are learned of, dependency on the therapy and the therapist can grow to unhealthy, if profitable-to-the-therapist, proportions.⁸⁰ This turn of events is not ethical. Or so most of us feel. The one who makes the wound should not be paid for the salve. But the pattern, of course, is that of *addiction*.

Addictive goods deserve a little more attention than has been devoted to the other kinds of goods that defy the law of diminishing marginal utility, not just because addiction is a serious social problem, but because our theory might have something new to contribute to understanding the mechanisms involved.

What makes a good addictive is not well understood. Even the definition of addiction is loose. One thinks of the abuse of certain drugs as the model case, especially of heroin, crack-cocaine, opium, morphine, speed (methamphetamines), and alcohol. More ambiguously

addictive are nicotine, caffeine, cocaine, and marijuana, or activities such as gambling, motorcycling, sexual conquest, shopping, or rock climbing. More difficult yet to label as addictions (although many do) are the inordinate weaknesses some of us have: creme eclairs, soft drinks, compliments, TV, bossing people around, picking our nose (when no one is looking), hearing children laugh, buying perfume, or reading the Sunday newspaper in full...in short, pleasures which we cannot pass up or that we are *very* unhappy to do without.

It would seem that addictiveness lies on some kind of spectrum. Nevertheless, a lot rides on the matter of definition, on the cut-off point. In 1994, for example, the Food and Drug Administration held hearings as to whether the nicotine in cigarettes was addictive and ought therefore to be Federally regulated.⁸¹ Tobacco companies at the time argued that cigarettes were not addictive, this on several grounds: that the level of pleasurable intoxication provided is very low, that very little time and effort need be devoted to finding cigarettes, that innumerable people *have* quit smoking, and that nicotine is not disabling in the sense of making smokers incapable of holding jobs or making rational decisions. (Indeed, many would claim that smoking helps their performance.) On the other hand, said critics, cigarettes generate tremendous dependency in smokers upon their continued and heavy use, and "quitting" is painful if not impossible for many. Moreover, all arguments about addictiveness had to be set against the uncontested fact that smoking is unhealthy.⁸²

Doctors Jack Henningfield and Neal Benowitz identify five criteria for substance addictiveness. Each of them can be judged and scored separately:

Withdrawal, the presence and severity of characteristic withdrawal symptoms; *Reinforcement*, ...the substance's ability...to get users to take it again and again and in preference to other substances; *Tolerance*, how much (more)...is needed to satisfy increasing cravings, and the level of stable need that is eventually reached; *Dependence*, how difficult it is to quit (as measured by) the relapse rate, the percentage of (first time users) who eventually become dependent, and self-rating of need...in the face of evidence it causes harm; *Intoxication*, ...associated with (the amount of) personal and social damage a substance may do.⁸³

We might wonder: how many of these criteria apply to tokens that are salted peanuts, and how many of them can be modeled with the analytical apparatus we have proposed so far?

I believe that all five criteria can be applied to "psychological substances" such as tokens, as well to activities like gambling, as well as to the drugs to which Henningfield and Benowitz

are addressing themselves. Moreover, all five criteria can be translated quite parsimoniously into the satisfaction wave formalism of our dissipation model. With this, some insights become available that might be useful to specialists in preventing and curing drug abuse.

In 1977, economists George Stigler and Gary Becker wrote an influential article defending consumer sovereignty. In this article they propose to model almost all human behaviors in utility-maximizing economic terms. When they come to the discussion of addiction, however, they come up short and conclude thus: "We would welcome explanations of why some people become addicted to alcohol and others to Mozart, whether the explanation was a development of our approach, or a contribution from some other behavioral discipline."⁸⁴

Well, here goes:

I propose that there are two unique characteristics of goods or tokens that become addictive:

(1) they produce satisfaction waves that, after a steep ascent and substantial peak, have a dissipation phase that sinks below the S -necessary level for a longer period than it is above this level, before coming up again, as illustrated in Figure 6.12, and

(2) they have low substitutability for other goods, and almost no convertibility-of-value once consumed.

These two characteristics, when co-present, suffice to characterize all addictive goods, weak and strong, from creme eclairs to heroin, from flattery to alcohol.

Figure 6.12 A satisfaction wave with a withdrawal phase

Let us now review this claim, and Figure 6.12, using Henningfield and Benowitz's five criteria for addiction.

Part of what makes a good addictive is that the satisfaction it affords is certain and large. This is its ability to *Intoxicate*. (We note, however, that intoxication itself is not harmful.)

It also comes swiftly, which gives us a "rush" of pleasure. This rush is what allows the immediacy effect to take hold, blocking from consideration any thought of unpleasant consequences. It also eclipses all other rewards less swift, less certain, and less large. This describes their *Reinforcement* criterion. Reinforcement is stronger if the needs addressed are low on the stratigraphy and the consumer is close to S -necessary for those needs (for example, if the good alleviates pain

or fear for one's life) and weaker if the needs addressed are higher on the stratigraphy and the consumer is closer to *S*-enough for those needs (if it delivers feelings of confidence or freedom). This explains the *akrasia* often associated with addictive goods.⁸⁵

Whereas most normal goods deliver a dose satisfaction that peaks and dissipates as shown in Figure 6.3, addictive goods leaves us worse off than when we started. Their dissipation phases do not slowly settle back to *S*-enough, but sink below it. This desperate feeling of lack is *Withdrawal*. What will relieve the feeling? Only another dose of the same kind of good: another pill, another drink, another round at the gaming table, another promise of fidelity.⁸⁶

To look at *Tolerance* and *Dependence*, we must extend our discussion by examining how satisfaction accumulates using the addictive wave form shown in Figure 6.12 This is illustrated in Figure 6.13.

Figure 6.13. Cumulative satisfaction for successive addictive goods

Assuming a constant frequency of consumption, we notice that the cumulative satisfaction provided quickly descends as the withdrawal phases of each unit good accumulates to offset the anticipation and onset phases of later goods. After one full period of the first and typical wave, the whole process settles into a repeating pattern and the addicted person finds himself in desperation more often than not. This in turn requires him either to increase his frequency of consumption. This is *Dependence*.

The alternative is to seek larger unit goods, which deliver higher peak levels of satisfaction. This solution is, of course, temporary. *S* will ultimately fall and stay below *S*-necessary if the duration of the typical withdrawal phase of each wave is long enough. This appears to us *Tolerance*.

As though to make matters worse, it common for duration and the depth of the withdrawal phases of addictive "goods" to increase with repetition of consumption. Dragged ever downward, the addict soon ceases to feel much satisfaction at all—only periodic release from desperation. There are parallels to this scenario in the realm of the psychoeconomy. Repeated social rejections after brief and gratifying acceptances (both involving approval and legitimacy tokens) cause feelings of humiliation each time to extend and fester. This can have a soul-destroying effect as the approval and legitimacy "addict" is driven to offer up to others more and more of whatever

maintains his sense need for respect and security. The drug addict who finally shoots his supplier on a street corner is not so different from the "disturbed employee" who, finally "let go," returns to shoot his former co-workers.

But none of this has actually explained the *why* of addictive goods and tokens; that is, *why* certain satisfactions dip us below the *S*-necessary line while others do not; *why* certain satisfactions are so specific to their causes that only exact reiteration will do while others are amenable to substitution; and why certain people are prone to addiction while others are not. From our theoretical model, however, some candidate answers can be deduced that might spur some empirical research:

The reader may have noticed a strong resemblance between the canonical *satisfaction* wave of an *addictive* good, shown in Figure 6.12, and the *pleasure* wave of a *typical* good, shown earlier, in Figure 6.6. Indeed, without the sustain phase of the latter, they would be identical. Identity is not necessary in order to make the suggestions I want to make, however. (Indeed, it is an artifact of the equations I used to generate the curves.) Similarity is enough.

Now, let us suppose that we have two assessment "agents," each being a special assembly of cells and circuits in the brain (probably in the amygdala). One agent assesses our state of total satisfaction, *S*. The other assesses the time-rate-of-change of *S*, dS/dT —which is to say, momentary pleasure. (There are also agents, we can suppose, that specialize in registering single-need satisfaction and pleasure levels too, as per our discussion on page 30.) These are not a very radical suppositions. Neurologically, there are many circuits that measure change exclusively—that are "comparators" or "differentiators"—for example, edge and motion detectors in the retina, accelerometers in the cochlea, velocity assessors as well as position-assessors in parts of the brain that govern motor coordination, and so on.⁸⁷

Let us suppose further that both assessments, of present *satisfaction* and present *pleasure* are normally combined in some way that registers "all is well with me" to higher parts of the brain. Here is my proposition: It might be *that substances we find addictive are ones that cripple the satisfaction agent and leave the pleasure agent intact*. Certain drugs might do this directly. But tokens, experiences, and even ideas might have the same, if milder, effect. People with "addictive personalities" might be people who, whether for chemical or cultural reasons, are less able to feel their own level of satisfaction than they are able to feel their pleasure. Unable to

count their blessings, as it were, they respond only to the receiving of new blessings and to their expiry, i.e. to pleasure and displeasure. It would be as though, for the addict, pleasure had become mistaken for satisfaction, as though pleasure had somehow usurped satisfaction's place in the matter of feeling/judging well-being. For *if pleasure is all that counts*, then no normal, non-addictive good or token can "satisfy" for long. After the peak of normal satisfaction is reached the slope of S is downward to the right; the measure dS/dT is negative in sign. Satisfaction stays positive, and would be enough for a normal person, but "pleasure-withdrawal" begins. And for the addict this is catastrophic.⁸⁸

We broached this argument earlier, in connection with the immediacy effect (p. 52 ff.). There we saw that during the anticipation and onset phases, pleasure was more salient than satisfaction. Here I have extended that proposition to include the whole wave form of a single good, which might be extendable in turn to the cumulative satisfaction provided by many successive goods.

If this is an at all accurate picture of what happens, then cures for chemical addictions can be few: (i) outliving withdrawal while desisting from the new intake of the substance, (ii) outliving withdrawal while substituting, as closely as possible, the positive satisfaction offered by the offending substance with one that offers similar satisfaction but produces no withdrawal phase, (iii) finding a second substance that offers no satisfaction in itself other than directly alleviating the withdrawal pains of the first, or (iv) finding a second substance that subdues the work of the "pleasure agent" in the brain and enhances the work of the "satisfaction agent."⁸⁹

In the case of addictions which are "purely psychological" all four cures might work too. Only cure (iv) has any claim to originality in terms of our theory however, and then perhaps not very much. For it becomes a matter of culture-developed *values*, a matter of discounting pleasure, in principle, in favor of satisfaction—of discounting the rush, the thrill, the lift, the stimulation, the titillation, the sensation-alism of what society offers to make us happier the faster, in favor of pursuits that require appreciation, stock-taking, admiration, understanding, savoring, judging, and the like, whatever the need addressed. Any number of spiritual traditions advise the same. The best system, of course, is the one that balances the two: the Middle Way, pleasure and satisfaction both. •

NOTES to Chapter Six: *Needs, Value, and Time*"

¹ The idea that different parts of the brain "report" to one another in general ways was first mentioned in Chapter Two, p. 13. Here I suggest also that it is mainly the older limbic and cortical portions of the brain (which deal with feelings, emotions, and physiological control) that send reports to the younger, higher, frontal lobes of the neocortex, which is where memories are reviewed and plans for action are made and where, probably, one's feeling of oneself as an independent living entity "having experiences" and interests originate. This is not to say that *no* reports go in the other direction.

² Friedrich von Wieser, *Natural Value*, ed. W. Smart, transl. C. A. Malloch (New York: Kelley and Macmillan, Inc., 1956; 1893).

³ Ever since Mill recommended that we prefer Socrates dissatisfied to a pig satisfied, philosophers (like Robert Nozick, for example) have been reluctant to elevate "satisfaction" (or "happiness" for that matter), to too high a position in the ranking of worthy human goals. In my view, of course, the reason to "prefer" Socrates in *any* state of mind to a pig is because Socrates represents greater *total* Ω —more life—than even the most ecstatic animal. To me, there is nothing "mere" about satisfaction or happiness.

Recall also, from Chapter Two, that "complexity-and-organization," Ω , is not the same thing as "complexity" alone, C . This means that many of the simplifications, truncations, preference structures, and freezings-into-norms-and-habits-and-traditions *can increase* complexity-and-organization, Ω , even as they *reduce* complexity C . It all depends where one begins on the Ω -surface.

⁴ Some argue that the increasing rate of divorce in the U.S. during the last quarter of the 20th century had little to do with declining marital satisfaction. Rather, it had to do with the decline in tolerance for marital dissatisfaction. (See Tibor Scitovsky, "The Economy's Impact of Family and Social Relations" in *Human Desire and Economic Satisfaction* [Brighton, U.K., Wheatsheaf Books, 1986] p. 167.) We might say that in the shift had to do with the level of "sufficient" satisfaction of the need for *freedom* was raised while that for the need for *legitimacy* was lowered. Whether the complexity-and-organization of society as a whole was increased by this between-need shift is an interesting question. Certainly, the manufacturers of cars, telephones, houses, apartments, and home appliances benefited as the growth in number of households exceeded the growth in population in that period.

⁵ Sir Julian Huxley, in his Romanes Lectures published in 1943, gives a yet broader view of the process:

When we look at evolution as a whole, we find, among the many directions which it has taken, one which is characterized by introducing the evolving world-stuff to progressively higher levels of organization and so to new possibilities of being, action, and experience. This direction has culminated in the attainment of a state where the world-stuff (now moulded into human shape) finds that it experiences some of the new possibilities as having value in or for themselves; and further that among these it assigns higher and lower degrees of value, the higher values being those which are more intrinsically or more permanently satisfying, or involve a greater degree of perfection.

Elsewhere, Huxley writes:

It is only through social evolution that the world-stuff can now realize radically new possibilities. Mechanical interaction and natural selection still operate, but have become of secondary importance. For good or evil, the mechanism of evolution has in the main been transferred [in man] onto the social or conscious level... The slow methods of variation and heredity are outstripped by the speedier processes of acquiring and transmitting experience...

Encyclopedia Britannica Online, www.eb.com.

⁶ James Coleman makes the same point in his *Foundations of Social Theory* (Harvard University Press, 1990), 39–40. See also Gerd Gigerenzer, Peter Todd, and the ABC Research Group, *Simple Heuristics That Make Us Smart* (New York: Oxford University Press, 1999).

⁷ Friedrich von Wieser, *Natural Value*, Ed. W. Smart, transl. C. A. Malloch (New York: Kelley and Macmillan, Inc., 1956; 1893), p. 53.

⁸ Jevons and Menger were utilitarians, as was J. S. Mill and many others since, most notably perhaps Henry Sidgwick. Utilitarians generally also subscribe to the Bentham's idea that "the greatest happiness for the greatest number" is the soundest principle we can hope to formulate as a basis for deciding the relative moral worthiness of laws and economic arrangements. We will have cause to examine the greatest happiness principle later on. For now, I should like to keep attention focused the individual and his or her satisfaction. (Note that utilitarians mean by "happiness" what we mean by "satisfaction," although it is interesting to pretend that they do not, i.e. that they *mean* positive change-in-satisfaction. I think the "greatest happiness for the greatest number" principle improves on this misinterpretation, since, with the law of diminishing marginal utility, it has a long run equalizing effect on people's satisfaction.)

⁹ Here is the origin of Alfred Marshall's famous principle of the "equalization of marginal utilities." Maslow, as far as I know, never made anything of this principle, even though it is inherent in his theory of motivation. Perhaps he did not know of it.

¹⁰ Spiegel, *op. cit.*, 533–534 is my source for this discussion of Menger's ideas.

¹¹ Cf. our discussion of the limited convertibility of tokens in Chapter Four, 43–45. See also Appendix Six, "Substitutability and Complexity" for a more formal treatment of the concept.

¹² Remember that satisfaction, according to our theory, is the feeling that accompanies the attainment of a certain level of complexity-and-organization demanded by the social and technological environment. (Cf. Chapter Two, 23 - 24). The degree of complexity-and-organization, Ω_{\max} , represented by S_{\max} , is thus culturally given, as is the individual's *capacity* for actually achieving such a degree of Ω as she or he can witness, understand, imagine, or strive for.

Why, then, do I not use " Ω " throughout instead of S ? Because there are mathematical operations that can plausibly be done with S that cannot strictly and correctly be done with Ω as we defined Ω in Chapter Two—or at least not as simply. Adding and subtracting magnitudes of Ω from each other is as tricky as adding and subtracting entropies or information-contents. It can be *done*—consult Satoshi Watanabe's 1969 *Knowing and Guessing* for how—but you don't want to get into it unless you have to run an experiment that depends on getting it right.

S is also the first letter of "satisfaction," of course, and it gives us a convenient bridge term to arguments made in economic theory without confronting us at every turn with the question as to whether Ω in this case is entirely equivalent. S and Ω , if you will, shine brightest in somewhat different worlds of discourse.

¹³ Remember that satisfaction, according to our theory, is the feeling that accompanies the attainment of a certain level of complexity-and-organization demanded by the social and technological environment. The degree of complexity-and-organization, Ω_{\max} , represented by S_{\max} , is thus culturally given, as is the individual's *capacity* for actually achieving such a degree of Ω as she or he can witness, understand, imagine, or strive for.

¹⁴ The reader may compare this with the fundamental mathematical form given to the diminishing value of a repeated good given by Daniel Bernoulli in 1730, who suggested that the economic significance of a unit of money income is inversely proportional to the amount of money one already had. Thus, if M denotes an individual's

income and the S the satisfaction he derives from it, he proposed that $dS/dM = k/M$ and $S = \ln(M) + a$ constant. " dS/dM " is the rate change of satisfaction with money; " \ln " the natural logarithm of. This same equation also became the basis for the Weber-Fechner Law in psychology which related the objective magnitude of a stimulus, such as the brightness of a light or the loudness of a sound, to the intensity of the sensory experience of it. Most economists made little, and continue to make little, of this apparent connection to Gossen's Law of Satiable Wants, this for the reason, amongst other reasons, that marginal utility of most things is much connected not only to what we have already but to what we still want, i.e. S_{\max} , a variable only indirectly "handled" by the constant k in the Bernoulli differential equation above. (Cf. Shumpeter, op. cit., 303, 1058).

¹⁵ Which not to say they do not sometimes use "satisfaction" and "value" when they want to explain themselves. Modern economists prefer to avoid the word *value*. They know it raises sticky philosophical issues.

Let me also note here that most modern economic theorists (unlike their 19th century counterparts) are convinced that neither utility nor marginal utility can be measured on a cardinal scale, as weight or force can be. Goods, they argue, cannot be said to *have* a utility of 56.23 units (once called "utils") or any other real number of utils. Any scale of utility, U , or marginal utility, MU , that appears on a graph like Figure 6.1, is therefore not entirely legitimate. All that we can do is *compare* two goods and ask which is preferred, and infer from that which has the greater marginal utility. Through multiple such pair-wise comparisons, one can arrive at an *ordinal* scale, which tells us which good beats which other(s), but not by how much. (And even this might not work out if people have "intransitive" preferences, i.e. preferring A to B, B to C, and C to A.) And if one cannot say by how much A is better than B, then one cannot really support statements about whether or by how much marginal utility "diminishes" or does not. (See Alan de Serpa, cited below, p. 108)

In this book, we either do not have this problem at all, or we have a very bad case of it. We have linked satisfaction (read: utility—no problem here) to complexity-and-organization, Ω , and Ω certainly is susceptible to cardinal measurement. For us, value (read: marginal utility) therefore also has cardinality. For us to say that system Z (at a certain scale) produces Ω at 33 bits per second, which is more than what system W produces by 24 bits, makes difficult but theoretically perfect sense.

At this, some economists would sigh. 19th century theory come back in this naïf. But oddly enough, few economists live by their own strictures on this score. The literature of economic theory is full of treatments of utility and marginal utility treated as though cardinal scales of them could be constructed, and this includes Paul Samuelson's canonical *Economics*—footnoted caveats notwithstanding (New York: McGraw-Hill Book Company, 1970 [1951], 8th Edition, 410–414). More fastidious authors find elaborate workarounds. For example, Alan de Serpa, in his *Microeconomic Theory* (New York: Simon and Schuster, 1988), 84–96, takes care to begin with indifference curves between two bundles of different goods. In that way, X and Y axes can be cardinal numbers—the quantities of those two goods consumed in a given time period—while their relative marginal utility is implied by the shapes of the indifference curves. (The curves are smooth. He ignores that most goods can only be had in integer quantities, and he ignores effects of actual frequency and order of consumption.) He then moves deftly onto safer ground, which is to use money (or "shadow prices") as the surrogate of marginal utility on the axiom (contra Bernoulli, see note above) that the marginal utility of a dollar is a constant and that the ratio of two prices must reflect the ratio of the two associated marginal utilities. Money-prices, income, profit, and so on, can certainly be put on the axis of a graph; and money quantities can certainly be added, subtracted, multiplied etc.

Meanwhile, in the literature, a thousand utility functions bloom each year of the form $U = U(W, X, Y\dots)$, where W, X, Y... are bundles of different quantities of goods, with U being treated quite like a continuous variable, with partial derivatives being taken on it and on non-continuous variables (like number of goods), etc., etc. (For example, de Serpa, p. 96 footnote.)

Moreover, there *are* techniques by which multiple pair-wise comparisons can yield workable cardinal scales, even with some intransitivity. For example: take $i = 1, 2, \dots, N$ goods that satisfy the same need, record the $N(N-1)/2$ results of asking "which do you prefer" with every possible pairing over a large number of people; add up the total number of times good i wins and call this its "score." Some goods will score high, some low, and some the same. It makes perfect sense to allow such a score to stand for that good's degree of goodness, marginal utility,

value, or some such, and to take the difference between any two scores to indicate the probable degree of difference in their good's value. On the market at the same price, the higher-scoring goods would sell before the lower-scoring ones. One can also use rating scales to get cardinal data in the first place: "rate this good's value to you from 0 to 100."

Would these be absolute arithmetical measurements of some objective attribute of the good, like its volume or weight. No. Even Ω , when it involves probability estimates, depends on the state of knowledge of the average observer. But it's unreasonable to expect human judgments to have the objectivity, unanimity, accuracy, or logical consistency of measurements of weight or temperature in the first place. And this is true of the hundreds of variables used by sociologists and experimental psychologists to tell us something interesting about ourselves. In law, court cases are resolved on the "weight of the evidence." How is *that* measured? Or the *severity* of a crime? And yet we do it all the time.

¹⁶ I shall not say it does not exist, but in the literature of economics I have found no account of the basis for the law of diminishing marginal utility that is as careful as the one I have tried to present here with the "shortfall model," or (with one outdated exception) as I shall soon present with the "dissipation model." In the literature, the simple observation that satiation decreases desire (and, therefore, marginal utility) is taken to be entirely self-evident, and a rock-like starting point for the "demand side" of economic theory. Even when exceptions, such as addictive goods, are duly noted, the observation is simply made that utility curve curves upward to the right in this case instead of downward, as they usually do. Done. We will try much harder to get to the source of it.

¹⁷ Cf. Note 54 below.

¹⁸ The anti-materialist, anti-consumerist "voluntary simplicity" movement that grew up the 1990s in the U.S. attempts the same strategy, if with a more secular cast. Inspiration is Henry David Thoreau's *Walden*. See Duane Elgin, *Voluntary Simplicity: Toward a Way of Life That is Outwardly Simple, Inwardly Rich* (New York: William Morrow, 1993), Sarah Ban Breathnach, *Simple Abundance: A Daybook of Comfort and Joy* (New York: Warner Books, 1995), and two sites that serve as guides www.gallagherpress.com/pierce/index.htm, and www.simpleliving.net.

¹⁹ Polymath Herbert Simon famously called this process, and this strategy for maximizing total satisfaction, "satisficing." See A. Newell and H. Simon, *Human Problem Solving* (Englewood Cliffs, Prentice Hall, 1972). In complex task situations, people will use heuristics, rules of thumb, guesses, etc. to reach outcomes that are "good enough" rather than perfect. It will be a few pages yet before we consider all needs at once.

²⁰ Some special consideration of tokens: Is the happiness we feel from the acceptance of tokens more complex than the happiness we feel at consuming chocolate? I would suggest that it is not much more complex at all—not at the level of abstraction with which we can analyze either phenomenon. It seems clear that as an item of relevant information each and every token one accepts is incorporated, assimilated, and ultimately dissipated—forgotten. Some tokens—for example, legitimacy tokens such as passports, deeds to real estate, academic tenure, and so on, recorded and sustained as they are by the matrix of public law and material records—last for a very long time. Others may not endure for as long, or may expire at a predetermined moment, like movie tickets, restaurant reservations, and business contracts. And many tokens, especially those belonging to the higher regions of the stratigraphy, are rather more like cut flowers or musical tones: they do their work (have their effect) and are "consumed"—more or less quickly to be sure, but consumed nevertheless to all intents and purposes without waste.

²¹ A reminder: it is a matter of convention to refer chiefly to good goods and positive value. Everything said, however, can be cast into terms of "bad goods" (bads) that have negative value. Here for example, we could talk about dread instead of anticipation, and of chagrin or regret rather than savoring.

²² In its post-peak dissipation phase, it seems clear that a "satisfaction wave" can be traced quite convincingly on the Ω -surface: imagine a clockwise, slowing course along a C_{pot} contour over the ridge of Ω . See also Chapter Two pages ...-....., and Appendix Two for a discussion of the second law of thermodynamics in terms of Ω . When satisfaction waves dissipate to levels less than the level of necessary, we start succumbing to addictive behaviors, as we shall see later.

Readers familiar with electronic music synthesis might enjoy comparing satisfaction wave-forms to musical wave-forms, with the latter's unique characters and harmonies. The term "sustain phase" was lifted straight from music.

²³ When I wrote these passages, I believed that the explanation of the law of diminishing utility based on the natural *dissipation* of satisfaction over time was a novel one. I subsequently discovered a translation of Gossen that showed that he had used just this sort of argument, albeit with a rather clumsy algebraic casting and with a bevy of (to my mind) extraneous considerations. See Hermann Heinrich Gossen, *The Laws of Human Relations and the Rules of Human Relations Derived Therefrom*, transl. Rudolph C. Blitz (Cambridge: MIT Press, 1983 [1854]), lxxiv ff. And see Nicholas Georgescu-Roegen introductory essay: "Gossen's Life and Works".

Gossen himself received very little recognition until his ideas was picked up by Jevons and Walras and Wieser some 20 years after his death. Daniel Bernoulli had noted the effect 100 year earlier than Gossen, but offered no explanation. It is Gossen's *explanation* of the law of diminishing marginal utility as "the weakening effect which continued satisfaction has upon desire" (Wieser's paraphrase) that is of interest to us.

²⁴ For the mathematically inclined, who might like to tinker with parameters, here are the formulae I used to generate the canonical satisfaction waves of Figure 6.3.

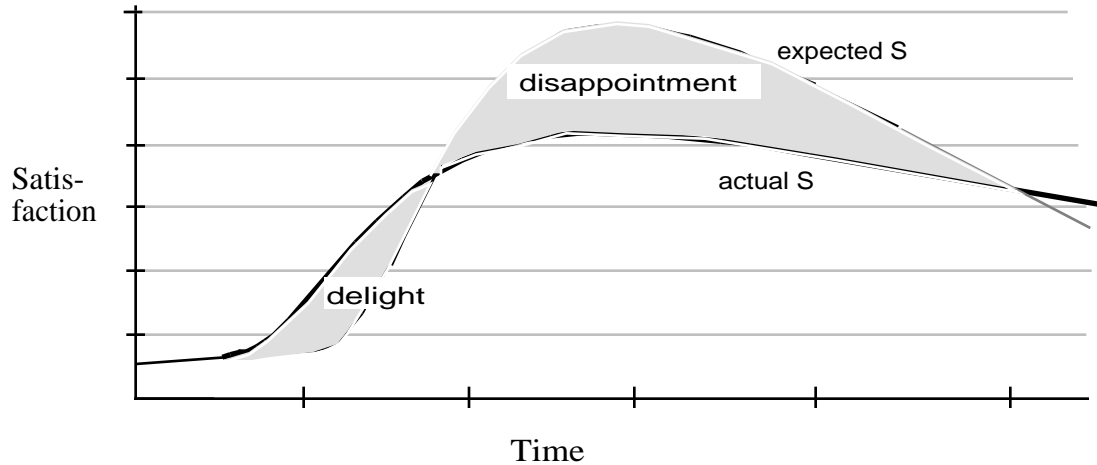
$$S = 0.4 \exp\left\{\frac{2(T - 1)}{T + 1}\right\}^4$$

where S is satisfaction and T is time, one good-reception/consumption event per integer-unit time. The cumulative satisfaction wave shown in Figure 6.4 is given by:

$$S = 0.4 \sum_{a=1}^n \exp\left\{\frac{2(T - a - 1)}{T - a + 1}\right\}^4$$

where n is the total number of goods received (at equal time intervals). There are many similar wave forms, perhaps the most economical being the "lognormal" form $y = \exp(-\{\ln[x]\}^2)$, of which the above could be considered a variant.

²⁵ With the dissipation model, it is also easy to look at satisfaction with respect to our *expectations* of satisfaction. If we receive less satisfaction than we expected, we are *disappointed*. If we receive more, we are *delighted*. Sometimes we can be delighted and then disappointed by the same good or token, and sometimes we can feel these in reverse order, disappointed and then delighted. Thus:



We all know people who are frequently and easily delighted, and others who are frequently and easily disappointed. Both kinds of behavior can be equally tiresome to others, however, because it is clear that there is no learning-from-experience going on. Rather, a simple mental habit or posture has been adopted that skews rational and independent valuation in favor of socially manipulative valuation. Such people produce "responses" *that others will have to respond to* rather than authentic responses to the thing itself.

²⁶ In Chapter Two we defined complexity-and-organization, Ω , as the square root of the product of complexity, C , and organization, R , where $R = (C_{\text{pot}}^2 - C^2)^{0.5}$. Holding C_{pot} constant, and starting from any position that is not already on the ridge of Ω and adding Ω will generate upward-to-the-right, bending-over curves that look like utility curves. *Are they?* Since I have argued that embodied (or should I say "embrained") complexity-and-organization and satisfaction (read: utility) are essentially one and the same thing, the answer is: yes. Wherever I have written S on a vertical axis of a graph, I could have written Ω . (Cf. Note 17 above).

Moreover, we would have the advantage of being able to describe overconsumption: it is going past the ridge of Ω and down the other side of the Ω -surface to too much C or too much R , as shown in Figure 2.6 as well as Figures 3.3, 3.4, and 3.7.

The truth of the matter is that there are any number of trajectories on the Ω -surface that have the overall geometrical character of utility curves with Ω as utility. These trajectories could be straight or curved in the space of C and R . They could even be loops, and, with Ω on the vertical axis of a graph, and any combination of C and R on the horizontal axis (for example, C , R , $\{C + R\}$, $\{C^2 + R^2\}$), look like a canonical, bending-over utility curves. In as much as this represents a generalization of strict marginal utility theory, it falls into the program of this book.

²⁷ Goods like cars satisfy many more needs than one, of course; and so do other people, which makes the analogy an oversimplification, to say the least.

Interesting to note also is how the value of the *last* good in a series is magnified if one knows of fears it is the last one. Why? Perhaps the impending plunge in satisfaction makes the height of satisfaction achieved that much more vivid, and one transfers the vividness, as it were, to the value of last good—"the last good-bye." And if one did not know at the time that a given good would be the last one, still, the value of it is magnified, in retrospect, in the imagination.

²⁸ As Hermann Heinrich Gossen tried to capture in a formal model for economics a long time ago. Georgescu-Roegen (in Gossen, op. cit., lxxiv–xc) finds much to fault in Gossen's rendition of how the enjoyment of recurring goods add up to greater or even optimal enjoyment. Part of Georgescu-Roegen's problem lies in going along with Gossen's linear representation of decreasing pleasure, not taking into account that when this curve is concave (as ours is) that enjoyment becomes self limiting. Nor does he look into the smoothing effects of anticipation itself. This is perhaps reasonable given that Georgescu-Roegen sets himself chiefly to presenting Gossen's thoughts and not his own. He wants to turn Gossen's difficulty into something emblematic of the problem at the heart of all such theorizing: "(T)here is no worthwhile result in view," he declares. Georgescu-Roegen then goes on, as though referring to our efforts here:

Gossen's law certainly revealed one of the most important aspects of how pleasures influence us and how we influence them through variation of recurrences of the same enjoyment. He broke new ground, *but no one seems to have tried to turn it over further.* (p. xc)

²⁹ Here we might comment on George C. Homans' proposals for a formal model of satisfaction in connection with rate of exchange/reward, and so on, in *Social Behavior* (New York, Harcourt Brace, 1961, p. 265ff.). At first glance his argument is similar to our shortfall model, but a closer look reveals important differences. Homans first offers us the following equation:

$$S = aR/(Q - R)$$

where S is the Satisfaction reported, R is equal to the "amount of reward received thus far" and Q is the amount of reward that would be required to satiate the person in question, and a is a constant of proportionality. $(Q - R)$ is thus Homans' want or "desire-remaining" measure. The interpretation seems straightforward: the satisfaction we report is a direct function of the total rewards we have received, and an inverse function of how much that total falls short of what we think we deserve. Plotting S against R , however, gives him a concave curve that ascends steeply as R approaches Q —quite the reverse of the marginal utility curve. This, in and of itself, is not a problem to us.

With pigeons ever in mind, Homans then takes the step of asserting that the frequency with which one "emits an activity," F_A , must be proportional to the frequency with which one receives a reward, F_R , as well as the amount of possible reward (felt to be) remaining, $(Q - R)$. Thus:

$$F_A = bF_R (Q - R).$$

Now, says Homans, if the ratio of the two frequencies F_A and F_R is itself a function of $(Q - R)$, (which amount Homans now calls the emitted activity's *value*, whereas up until now he had equated value with "degree of reinforcement" per unit of activity [p. 40]), so that $F_A = c'F_R = c(Q - R)$, then we/he can write

$$F_A = bc(Q - R)^2$$

When graphed, this gives us a concave curve with F_A rapidly declining at first and then levelling off as R approaches Q . In other words, as "rewardedness" reaches its maximum, so does the frequency of behaviors emitted to achieve maximum reward fall off. (Homans then goes on to cover the case of what we will call "climactic satisfactions," which, he says, is captured by $F_A = S$, and is characterized by F_A increasing rapidly as R approaches Q).

In all this, Homans drives a wedge between "rewards" and "satisfaction," demoting the latter to mere reports of inner feelings and elevating the former to scientifically measurable goods like grains of feed, minutes of attention, or dollars of salary. Indeed, his whole theory is built out of this tension. We, on the other hand, build our model entirely out of satisfaction and make no judgment as to the rewardingness of the good *except in so far* as it makes a person more-satisfied, i.e. happy. The problem of measuring satisfaction in experimental situations is

difficult to be sure, and Homans reminds of this. But it is no more difficult than assessing any number of other "internal" states that people occupy by degrees: how hungry is John? How jealous? It is only a philosophical stance that tries to *eliminate* internal state-descriptions in principle—which is more interested in behavior-frequencies than in feelings—which allows Homans to make the moves he does.

Certain technical problems remain for Homans however, even in his own terms, and beyond the ones I have already brought out. For example, his first equation admits of infinite satisfaction. His second equation, if the right hand were side set over R so that, just as plausibly, F_A was a function of F_R and the inverse of Satisfaction, S , he would have shown the diminishing marginal utility of F_A with F_R for constant satisfaction. Homans' derivation of the third equation is based on asserting that $F_A/F_R = c(Q - R)$, but he cannot explain why, really, this should be the case (p. 280). He seems all too anxious to arrive at equations of the second degree, which are more interesting as scientific graphs go.

Homans makes some trenchant observations in this chapter as to real human behavior, just as he does throughout the book. But finally, he walks away from the whole question of formally modeling exchange using satisfaction or happiness (or for that matter, using rewardingness, or profit or investment, those other economic terms he so favors and in which we too share an interest). "Satisfaction is verbal and emotional behavior," he concludes,

...and its relation to other kinds of behavior is not at all clear. We asked the old questions of the relation between satisfaction and productivity, the relation between a man's satisfaction with a reward and the frequency with which he emits activity that gets him that reward. We found that there was no simple general relation between the two. The reason is that the relation between satisfaction and productivity depends on a third variable, the frequency with which the activity is rewarded, and this schedule of reward may take on different forms under different conditions of exchange. Often, but by no means always, the more satisfied a man is, the less productive he is. (p. 282.)

Our analysis—on either the dissipation or the shortfall model—is quite capable of suggesting why Homans' parting remark should be true (or rather, *how* it is true, since it is in and of itself an unfalsifiable claim). And our answer has nothing to do with the behaviorist's "reinforcement schedules." The value of positive tokens—"rewards"—decreases as S_{\max} is approached. Increasing F (or N) with respect to this need does not much help our happiness unless, switching now to the dissipation model, the dissipation rate of the "rewards" are disproportionately high. In other words, there can be room for improvement with F if the goods are such that their lastingness is short and cannot be extended. Even here, however, F eventually ceases to be helpful. The reverse of all this is true only with "climactic and other satisfactions," to which we shall soon turn our attention. Homans' analysis sheds no light on these matters.

³⁰ George Ainslie's *Picoeconomics* (New York: Cambridge University Press, 1992) is devoted almost entirely to explicating this irrationality. The reader is referred to this book for an account of all the research that leads to this conclusion about human choice behavior. See also Thaler, and Frank, 1988, op. cit. p. 76 ff.

³¹ John Stuart Mill, *Utilitarianism* (London: Routledge, 1871) p. 19.

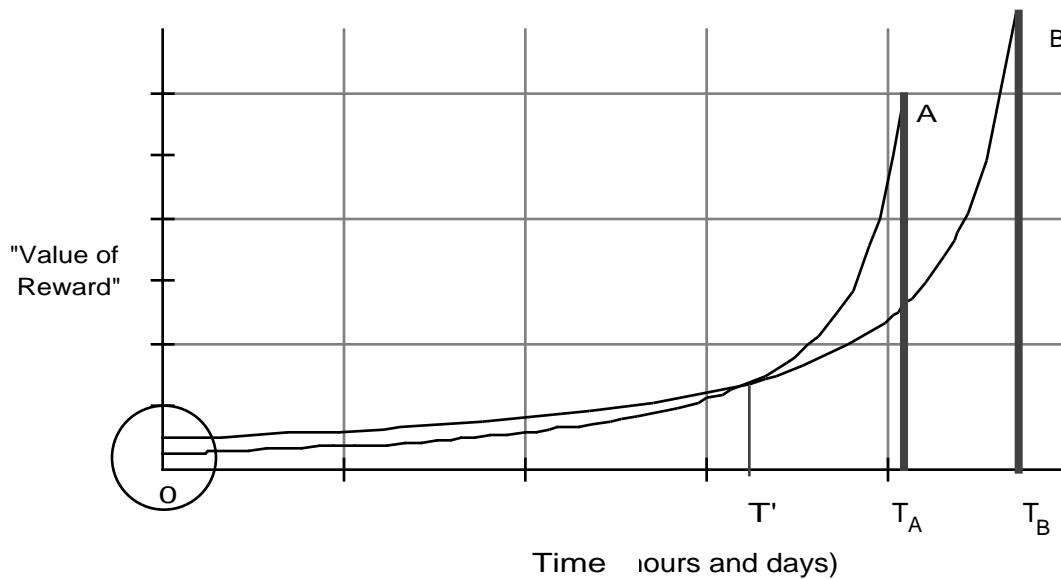
³² A. C. Pigou, *The Economics of Welfare* [London: Macmillan, 1920] p. 25. Sigmund Freud also had much to say on the topic. On Freud's view, to be a *person*—or sane person anyway—required that we be able to control our immediate impulses, that we learn to sacrifice the satisfactions of today for the greater satisfactions of tomorrow: the superego controlling the ego controlling the id.

No doubt, such observations on human nature are to be found in medieval as well as classical philosophy, in Eastern as well as Western wisdom literature down through the centuries. See also Ainslie, 1992, op. cit., 56–60.

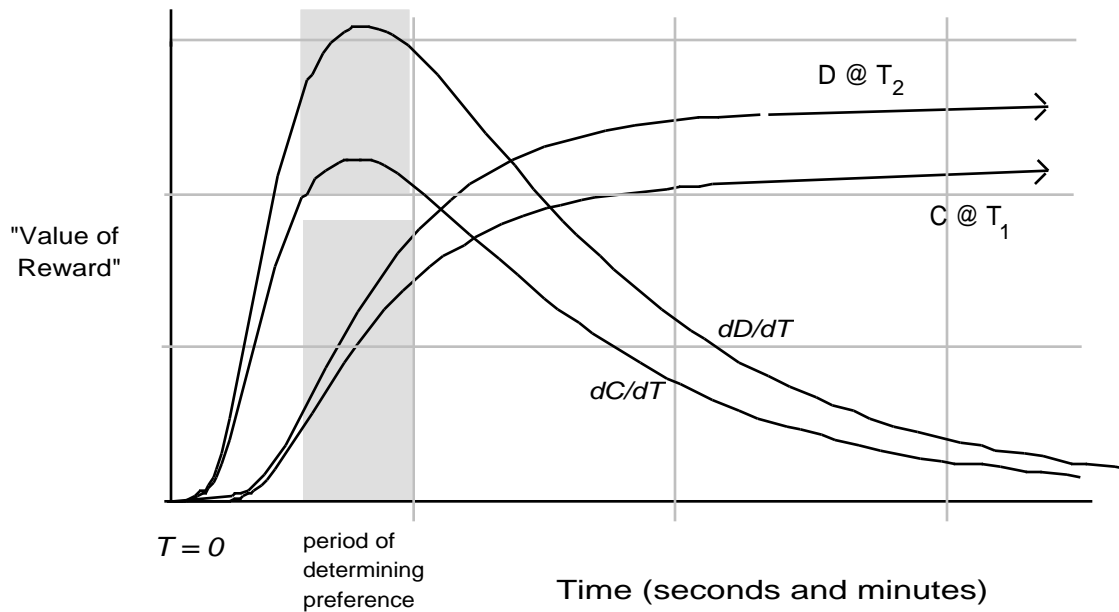
³³ See Chapter Four, p. 10, 24.

³⁴ Ainslie, 1992, op. cit.

³⁵ This is similar to, but not the same as, the explanation offered by Ainslie and rehearsed by Frank (1988) op. cit. Looking only at the anticipation phase, Ainslie has an absolute time scale on the horizontal axis with "value of reward" (= our "satisfaction") on the vertical axis and an extremely bowed, hyperbolic curve relating the two, thus:



The smaller of two rewards, A, is scheduled to be received at time T_A ; the larger, B, at time T_B . Before time T' , B is slightly preferred, but after time T' , A is markedly preferred because it is the more imminent. The curves represent the present "effectiveness of the (future) reward," which Ainslie also calls the reward's *value*, and this corresponds roughly to our idea of satisfaction-in-anticipation. The reader will notice that it is also the case that the slope of the two curves differ markedly after T' , and any decision principle that combined pleasure with happiness (which is the same as satisfaction in the single-token-case starting at zero) either through addition or multiplication would cross over at or around this point (i.e. T') too. But it is something of a sleight of hand on Ainslie's part to have these curves begin abruptly with the larger reward already ahead. Surely, at the moment of being given the choice, i.e. at $T = 0$, the "effectiveness" of either reward is zero too. Ainslie must suppose that the larger reward jumps ahead immediately, so that the circled region above, upon close inspection, really looks like this:



Indeed, there must be a period of time—we might call the *onset* of the anticipation phase—over which the decision is made as to which of the two rewards to prefer, a discrimination which can be made more quickly if it is based on pleasure, the "time intensity" of anticipatory happiness, which itself is most pronounced in the early moments.

In all, Ainslie's study of the immediacy effect shows us that the anticipation phase of a token can have a more complex and extended structure than we have allowed ourselves to study fully.

³⁶ Derek Parfit, *Reasons and Persons* (New York: Oxford University Press, [1984] 1987) chiefly, 349–379.

³⁷ See Ainslie, 1992, *op. cit.* for a review. Of course, the fact that money is the common reward in this literature may be the place from which to launch a critique. Money is a unique sort of token; people have unique attitudes towards it, as Ainslie acknowledges (p. 228–242), some of which we will explore later. See next Note.

³⁸ It's interesting to compare Parfit's proposals about the non-stability of personal identity with John Rawls' proposals in *A Theory of Justice* (Cambridge: Harvard University Press, 1971). In Rawls's theory of justice, laws are just if they are laws that would be made by rational, self-interested individuals *who did not know who they would be* in the future, i.e. when that law applied. Lawmakers who imagined themselves re-born in that future as someone else in that society, at random, would make the fairest laws. Curious in Rawls' thought experiment, however, is that, in order to work as supposed, the participant lawmakers must not *quite* believe in its premise. They must believe that the new person they would be would still, somehow, be *them* being that other person. Without this element of continuity, self-interest as a healthy constraint makes no sense, and one is thrown back to the ordinary care that ordinary lawmakers have for others' welfare.

³⁹ Of course, we don't know *when* we are going to die and therefore how long our plenitude will be. Because of this, some could argue that calculations involving the length of one's plenitude are at best questionable. Others would disagree. For one, $(x - 2)$ is less than $(x - 1)$ no matter the value of x ; and since we could well die

tomorrow, the percent-of-plenitude difference between $(x - 2)$ and $(x - 1)$ might well be large. For another, most people are well aware of what the average lifespan has been in their family and expect to live at least that long. What 80-year-old thinks they're going to live forever? What 20 year old that they will not?

⁴⁰ The logic bears similarity to transactions involving money: future income being worth less than money-in-hand by at least the amount of the prevailing interest rate for lending that money-in-hand with absolute safety. As Ainslie and Frank (1988) point out however, the interest rates for psychological goods—if they were to follow strictly the same logic—would have to be absurdly high, and nonlinearly compounded, to explain the short term preference reversals experimentally observed. For example,

...a study of actual air-conditioner purchases showed that in accepting higher operating costs in return for lower purchase prices, consumers devalued the future at annual rates as high as 89%.... Similar studies have sometimes found rates in the hundreds of percentage points. (Ainslie, 1992, op. cit. p. 59.)

Even as they beam with gratitude, most 13-year-olds know that a \$200 birthday gift from dad will not be as impressive to them ten years hence, when they fully expect to be *rich*—and dad even richer.

⁴¹ Cf. Chapter Two, Note 20. Compare Figure 6.10 also to Figures 1.6, and my remarks on games in Chapter Two, 23–24.

⁴² It could also be argued that at any time, t , *plenitude-remembered* also bears little relation to reality. Empirical evidence as to how people assess their expected and historical levels of satisfaction could well lead to the re-drawing of Figure 6.10 entirely with *idealized* curves that would, from a behavior-predictive point of view, be more useful than any objective ones! Moreover, the shape of such Ω curves (each derived from an averaging of many individual reports, of course) would likely depend on the value of t chosen.

Here's one way of formalizing the more complex calculation of value we are now exploring:

$$\begin{aligned} V_P(i) &= \Delta Plen \cdot p(\Delta Plen) \\ &= w_s [\Delta \Omega \cdot p(\Delta \Omega) \cdot \Delta T \cdot p(\Delta T)]_{\text{short term}} \\ &+ w_m [\Delta \Omega \cdot p(\Delta \Omega) \cdot \Delta T \cdot p(\Delta T)]_{\text{medium term}} \\ &+ w_l [\Delta \Omega \cdot p(\Delta \Omega) \cdot \Delta T \cdot p(\Delta T)]_{\text{long term}} \end{aligned}$$

where $V_P(i)$ means the value to P of good or event i , $\Delta Plen$ stands for the change in P's plenitude that is reasonably ascribable to i , $p()$ means "estimated probability of", $w_s + w_m + w_l = 1$ are the three relative weightings given by P to short term, medium term, and long term considerations respectively, $\Delta \Omega$ is change in Ω , and ΔT is change in the temporal extent of that change in Ω . Usually, $w_s > w_m > w_l$. In addition, P's characterization of "short term", "medium term" and "long term" is apt to vary, from "short" meaning "the very next minute" to "this week", "medium" meaning from "today" to "this year," and "long" meaning from "next month" to "the rest of my life." Rationality, however, requires that the *sum* of the three time periods assigned add up P's life expectancy, i.e., that $\Delta T_{\text{"short term"}} + \Delta T_{\text{"medium term"}} + \Delta T_{\text{"long term"}} = \textit{likely remaining lifespan}$.

⁴³ We see a dim manifestation of this logic when use the measure "man-hours" to capture the quantity of labor required to produce a good. We could, symmetrically, use "man-hours" to measure of the amount of good the good *does* in lengthening lives. Thus, to have positive social value, a good that takes 20 man-hours to produce

should produce more than 20 man-hours of extended life. The problem with the man-hour measure in either application, of course, is how roughly it deals with the per-unit amount of knowledge or intelligence that goes into the designing-making-marketing of the good on the one hand, and the intensity-of-satisfying-experience the good produces on the other. Both are Ω . The problem is compounded by the fact that labor has its own positive rewards—physical, psychological, and financial—and consumption its own costs in the same three dimensions. Our trust is that the marketplace sorts this all out, with salaries, returns on investment, and prices reflecting the shifting balance of such imponderable "goods" and "bads" among each other.

⁴⁴ Another Zen Buddhist story: A wandering Zen monk is chased by tiger. Trying to escape he leaps over a cliff. Half-way down he grabs onto a grape vine. Safe for the moment, he looks up to see a mouse gnawing on the vine. He hears the tiger below, and sees it leaping up to reach him. He looks up again to see the mouse joined by another. Now both are gnawing at the vine. Below him the tiger is leaping higher, getting madder... And then the monk looks straight ahead of him and sees a perfect bunch of grapes, there all along. Suddenly enlightened, he proceeds to eat the grapes in perfect calm, and with great enjoyment.

Most Zen parables make us want to live more fully and spontaneously in the present, playing down all nostalgia, regret, planning, ambition, and problem-solving when their objects are only in the mind, and thus illusionary. In our terms, this is dedication to Ω moment-by-moment, and to Ω from the physical environment only at that. It's no wonder that Zen has been the inspiration of artists, East and West, for so long.

⁴⁵ Prominent among psychologists developing credible instruments for measuring ongoing happiness, satisfaction, and the like, is Mihaly Csikszentmihalyi, whose work on "flow" we looked at briefly in Chapter Three.

⁴⁶ A statue, of course, *can* be thought of as a process. A particle physicist certainly would want to make this point, what with all the molecules and atoms vibrating away and neutrinos passing through. An engineer would let it go. A psychologist might direct our attention to the human psychophysical *processes* of seeing, measuring, and appreciating the form of statue in the first place. And indeed, we would argue that the beauty of the statue—if beautiful it was—would lie in the omega of the beholder.

In Chapter Four, I discuss the Ω of DNA at the scale of codons. It may seem that there I indeed applied Ω to a static thing—to a statue—and did not frame it as a psychological process or *our* timeful perception of DNA's complexity. I claimed that DNA objectively "had" this value of Ω . This is because I was speaking more like a particle physicist. That is, I was allowing that DNA doesn't just lay about, as it were, *being* DNA. Rather, in every cell, its codons and codon sequences are constantly at work, reading and being read, producing proteins, and so forth, in the most timeful way. The probability of a certain codon *occurring* in the *process* is very real in this sense. DNA hums.

⁴⁷ Two observations here:

(1) Aristotle taught that a man's happiness cannot be assessed, by himself or anyone else, until he is at death's door. "Happiness" properly applies to a whole lifespan, not to any transitory moments or periods in it. In our terms, what Aristotle meant by "happiness" is the plenitude of a whole life.

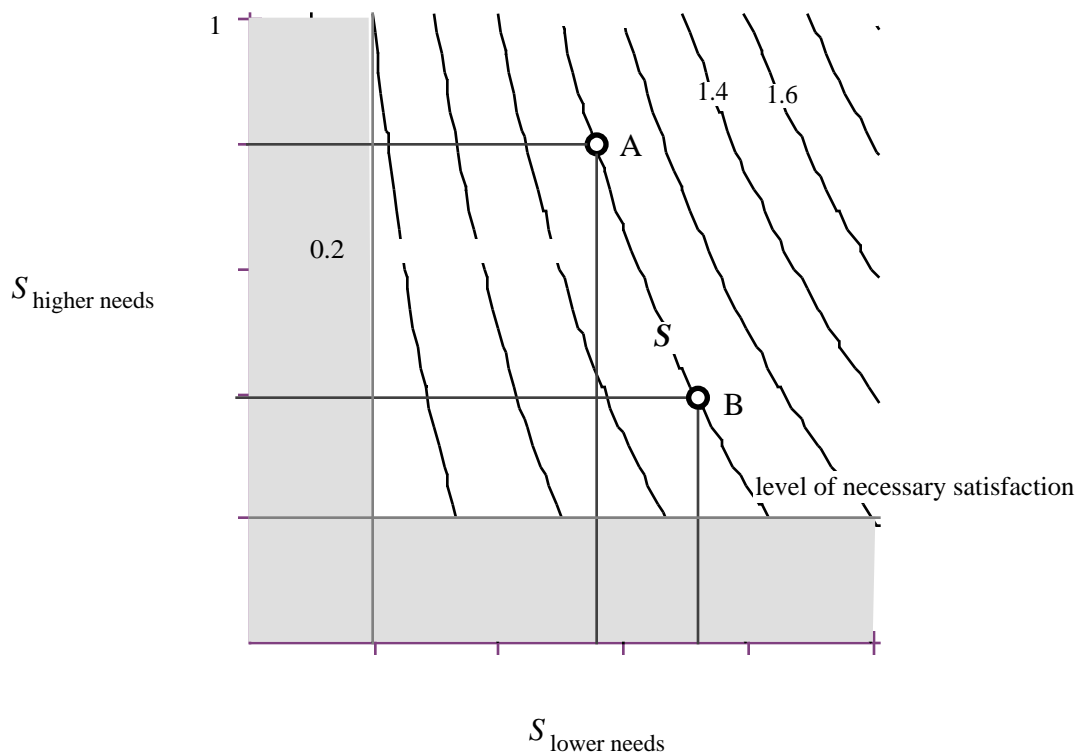
(2) In *More Heat than Light* (New York, Cambridge University Press, 1989), Philip Mirowski criticizes economic theory for its adoption of the "value-as-substance" and "value-as-energy" metaphors. I offer the same criticism (see Chapter Seven, Note 28). Mirowski ascribes this mistake to economists' historical envy of physics and that discipline's legitimate use of the mathematics that applies to integrable, continuous, and conserved quantities such as energy, force, and—in non-relativistic physics—mass. Neither value nor utility, says Mirowski, can be analogized to any such physical "substance." And yet, here we are—or rather here *I* am—once again propounding a universal substance-quantity—plenitude—which, like utility, can be conserved and increased (or decreased) in "amount."

What can I say? The measure Ω represents a break with mass-energy physics and a move towards the "physics" of complexity and information, which is something quite new in science and problematic still. Is information a conserved quantity? I think it is (see Chapter One, Note 45), but for most scientists the answer is either "no" or "the verdict is still out."

⁴⁸ Again, let us bear in mind that every S on the right hand side of these expressions might be replaced by an Ω and the S on the left by Ω .

Note also that if we keep to the convention that $S_{\max} = 1$ for any single need or "collective need," then $S_{\max} = 6$ for the long expression and $S_{\max} = 2$ for the short one. I did not want to multiply the latter by 3 since my purposes are more expositional than mathematical. Technically, the unit of value and satisfaction is bits. However, normalizing S_{\max} to 1 distorts the usefulness of the unit. In any empirical work, S_{\max} for each need would need to be determined within the experimental framework of tasks, questions, and so forth.

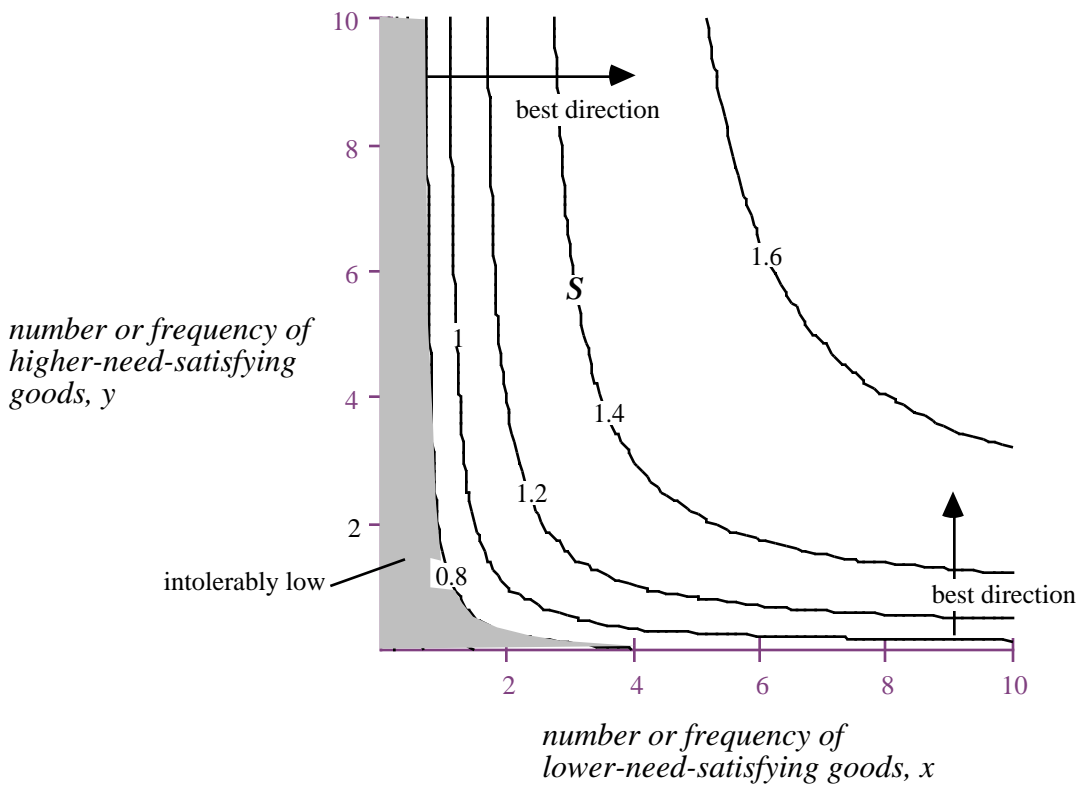
We can graph total satisfaction, S , in terms of lower-need and higher-need satisfaction levels thus, where the shaded area indicates unacceptably low satisfaction of one or the other:



Economists will recognize the contours as similar to *indifference curves*, meaning that people ought rationally not to care *what* combination of lower-need-satisfaction and higher-need-satisfaction brings about the *same* magnitude of total satisfaction, S . One ought to be indifferent, for example, between position A and position B in the graph above since they both yield $S = 1$.

I say the contours in the figure above are *similar* to the economist's indifference curves rather than *identical* to them, not because I am not avidly using the economist's language of utility and marginal utility and so on, but because in graphs showing indifference curves, the X- and Y-axes typically represent *quantities of goods*—X-goods

and Y-goods, bread and beer—consumed, not the satisfaction (utility) or value (marginal utility) that consuming these quantities of goods yields. Using our shorter formulation of S and the simple utility curves given by $S_x = x/(1+x)$ and $S_y = y/(1+y)$ —where x and y are the number (or frequency) of identical goods that satisfy lower and higher needs respectively—gives us the following "true" indifference curves:



⁴⁹ Imagine you have six accounts at the bank, accounts between which you may not transfer money. Imagine that, at irregular intervals, you receive six kinds of check. Each check is made out in a some unknown-to-you currency (but you can see the amount, or conversely, the currency is dollars but you can't see the amount), and can only be deposited into the specific account to which it is addressed. Finally, imagine that the bank will send a periodic statement only of your total balance across all accounts: i.e. a single number, in dollars.

You would expect that your balance would be arithmetic sum of the dollar value all the checks received to date (assuming you didn't spend). But what if a check going to account A, always, *somehow*, yielded more in the total balance than a check "in the same amount" going to account B? (Or what if there seems to be a ratio relationship, or a probabilistic one, such that a check from A *usually* made the total jump twice as much as a check from B of the same face value, and half as much as one from C? Or a conditional relationship: A's check is worth more than B's if there's been none from C for three days, but otherwise less? And so forth.) It would not take long for you to figure out that the value of a check depended not just on the amount written on it but on *who* it was from *when*, in what currency, and so on, and you would soon learn which accounts were most productive of total value. You would get a feel for the apparent mechanism of their "addition" too. In short, you would have a *theory*.

The point is that from the behavior of the total (output) of a system *over time*, and with just a little knowledge of the timing of various inputs, a great deal can be inferred about the manner of their internal combination. Indeed, the procedure is common throughout the sciences, from physics to psychology.

⁵⁰ This is true of all "totals" relative to their constituent "subtotals." A 50 percent change in a subtotal that was itself just 10 percent of the total, would cause a change of only 5 percent in the total. One wonders whether at the root of mania is a preoccupation with only one need—a chronic inability to register *total* satisfaction, to count *all* one's blessings.

⁵¹ To recap, the "proper" rank ordering among the needs is this: attention to the need for *freedom* if and only if the need for *confidence* is satisfied enough, attention to the need for *confidence* if and only if the need for *approval* is satisfied enough, the search for *approval* if and only if feelings of *legitimacy* are strong enough, questing for *legitimacy* if and only if *security* is taken care of, and *security* if and only if *survival* is not an issue.

⁵² Cf. Chapter Four, p. 32 ff, where the idea of well-founded vs. ill-founded freedom is introduced.

⁵³ Formally, this increases *S* by putting in place an artificially high nominal value for *S*₃, satisfaction of the need for legitimacy.

⁵⁴ See Chapter Five, 7–11, for a discussion of the different kinds of force that are associated with each need in the stratigraphy.

⁵⁵ These insights into unsupported self-esteem and the origins of criminally coercive behavior were deduced entirely from our theory of needs and from the equation on page 29.

Roy F. Baumeister, in his article "Violent Pride" (*Scientific American*, April 2001, pp. 96–101) reports research arriving at a similar conclusion empirically. "People...are loathe to make downward revisions in their self-esteem," he writes in summary. "When someone suggests such a revision, many individuals—those with inflated, tenuous, and unstable forms of high self-esteem—prefer to shoot the messenger." (p. 98) This contradicts, he notes, the common-knowledge view among counselors, social workers and teachers that aggression stems from low self-esteem, and is best curbed by boosting it.

See also Lauren Slater, "The Trouble With Self-Esteem," the *New York Times*, Feb 3, 2002, available online at www.nytimes.com/2002/02/03/magazine/03ESTEEM.html.

⁵⁶ The Le Monde article in question is cited without bibliographic reference by Zygmunt Bauman in *Modernity and the Holocaust* (Ithaca, Cornell University Press, 2001 (1986)), p. 6, from which this passage is taken.

⁵⁷ Bauman, op. cit., throughout. See also Nechama Tec, *When the Light Pierced the Darkness: Christian Rescue of Jews in Nazi-occupied Poland* (New York: Oxford University Press, 1986)

⁵⁸ Cf. Slavenka Drakulic, *Cafe Europa: Life After Communism* (New York: Norton, 1997). Poorly-founded freedom is a fragile freedom, making its possessor subject to exploitation. This exploitation often begins with temptation. What do blackmailers do? They threaten the victim's appearance of propriety (a.k.a. legitimacy), capitalizing upon the disjunction in all of us between public and private behaviors.

Extortionists aim lower yet by threatening our security and survival.

In both cases, however, ordinary people's inbuilt capacity for *akrasia*, for two-mindedness, offers those who would have power over others ample opportunity to enter into relationships with *ostensibly* confident and free people and to coerce them with offers, threats, and enticements pitched much lower on the stratigraphy.

Does this have anything to do with the everyday play of power in organizations and institutions? Yes, it does. Indeed, one might argue that it explains it. Few who work with or for others on a day to day basis are unfamiliar with that constant and sometimes debilitating feeling of being-in-two-minds, a feeling that allows us both to accept and resent our "strings being pulled," even as we profess autonomy at some higher plane. How much worse is it when the scenario is played out largely within oneself? If our inner calculations mirror outer ones, as I have suggested, then not much.

See also Fred S. McChesney, *Money for Nothing: Politicians, Rent Extraction, and Political Extortion* (Cambridge: Harvard University Press, 1997).

⁵⁹ Different societies, and different institutions within them, valorize some needs over others in a permanent way, setting S_{\max} and the level of enough satisfaction in those needs very high for its members. This precipitates what, to outsiders, look like constant and low-value trade-offs. Giving up security—and just about everything else—for *legitimacy* is a trade-off encouraged by Japanese culture, for example. Or so Americans think. But giving up legitimacy—and just about everything else—for *freedom* is a trade-off encouraged by American culture, much to the envy and disbelief not just of the Japanese, but of all traditional cultures. The reasons for societies valorizing some needs more than others are many, and entirely historical. See also Chapter Four, p. 12, and Chapter Four, Note 24.

⁶⁰ With countries as with people: internal division invites external intervention. Cf. also Chapter Four, p. 25 for a discussion of nobility.

⁶¹ P is not necessarily being selfish here; we can imagine that x has more value to P than y does because x benefits more people (or animals or things) that P cares about.

⁶² This is the argument made by Martha Nussbaum in *The Fragility of Goodness* (Cambridge: Cambridge University Press, 1986), 113–117.

See also Amélie Oksenberg Rorty, "Self-deception, *akrasia*, and irrationality," in John Elster, ed., *The Multiple Self* (Cambridge: Cambridge University Press), 115–131. Here Rorty argues for the second and third lessons: that *akrasia*, if it is a problem at all, is a small one. *Akrasia* often helps us do what "cannot," for poor reasons such as convention, be done. It also allows our often-sounder but hazy intuitions to beat out our often-simplistic but clear reasons. See also Rorty's article "The social and political sources of *akrasia*," *Ethics*, July 1997, 107, 4, 644–658.

Given how open it is to introspective confirmation, the idea that one's desires and reasons are not psychologically monolithic is old. Comparing the mind to a political entity like a state or city, with all its agents and interest groups locked in never-quite-resolved conflict, goes back to Plato's *Republic*. One finds similar attempts to deal with multiple-mindedness in Augustine's *Confessions* and Nietzsche's *Genealogy of Morals*. The problem received a new treatment by Freud, who added the idea of the subconscious *id*, whose desires and reasons "we" cannot understand (without undergoing psychoanalysis). Modern cognitive science in pursuit of artificial intelligence was greatly influenced by Marvin Minsky's *Society of Mind* (New York: Simon Schuster, 1985), the very premise of which is that intelligence arises from bottom-up hierarchies of autonomous neurological/computational "agents," each specialized in function and limitedly self-interested in purpose, which are in constant conflict and compromise with each other.

⁶³ Cf. Note 46 above.

⁶⁴ Either this, or they are so incapable of delayed gratification that they choose to enter an enterprise only when the reward is imminent. See Note 52 above. We might also mention the inordinate amount of time it takes for an elevator to arrive or for a traffic light to change when we are late for an important appointment. Here the increasing value of our time penetrates our most involuntary levels of perception.

⁶⁵ The underlying logic of this effect is easily exploited and even reversed, however, by specific income and legitimacy token distribution arrangements. Consider "temp agencies": they provide temporary labor to firms finding themselves short-handed, often in the face of some deadline. Are these temporary workers welcomed like heroes? No. Are they paid especially well? Usually not. Indeed, they are typically resented by both the managers who call for them and the permanent workers who work with them. And temps are paid rather poorly. Why?

First we should note that temp workers are generally under-trained for the job if for no other reason than that they have little or no contextual/historical knowledge of the firm or the project they are joining. Having no

long-term interest in the success of the firm or project, they are apt to be under-motivated. This under-motivation is exacerbated by the fact that they receive very few of the firm's legitimacy tokens; they are not *really* company people. They "belong" to a temp agency, which, moreover, takes a third of what the firm pays for them as commission.

Second, managers who find they must resort to using temp workers are often embarrassed not to have planned ahead sufficiently or not to have worked/managed/motivated their employees well enough to meet the deadline (or the constant workload, for that matter). Employees may take some of this guilt upon themselves. The presence of temp workers is thus a rebuke to both parties. Employees who feel underpaid and under-appreciated are especially apt to feel hostile to temps: why, wonder the permanent employees, does management not pay *them* well enough to feel investment in the firm or project, or at least pay them good overtime rates to put out the extra effort required to finish the project by deadline? Here, they feel, the increasing value of time would be adequately assessed and fairly paid for, rather than be diluted through giving it to strangers, and leaving them feeling permanently underpaid.

And dread: what if the unfamiliar and untrained temp worker(s) turn out to be just as productive as they are with all their training and background? Will they not be "shown up" to management, the simplicity of their jobs exposed?

It would seem, then, that for the increasing value of time to translate into higher pay or regard (approval) for those who operate at the final days and hours of a deadlined project, as I argue in the text, that legitimacy and security questions must be moot and/or the rewards of success be distributed to all, workers and management, alike.

⁶⁶ James P. Carse, *Finite and Infinite Games* (New York: Free Press, 1986)

⁶⁷ The practical implications of this observation are many. If it is technical sophistication a producer of certain goods or services is after, or if technical sophistication is the means by which he wishes to raise the *value* and therefore (other things being equal) raise the *price* which he can command in the marketplace, then it will be an attractive option for the producers (and purveyors) of the product to advertise it as being somehow intrinsically *mission-critical*, this no matter how trivial that mission itself really is. It is one thing for producers to encourage, and to profit from, consumer's competitiveness with each other, but it is a powerful extension of this strategy to begin to *define* or depict the nature of *what alone will constitute the proper climactic satisfaction*, or winning, or both. Think of the strange value of diamonds. Thanks to the de Beers Company, it is commonly held among middle classes in the U.S. that if a young man spends less than one third of his annual salary on an engagement ring, then he is not sufficiently committed to his bride-to-be: he simply not meeting the standard, not sufficiently a *man*.

The value, and often therefore the price, of mission-critical goods is enormous. Intense satire was directed at the Pentagon's paying \$10,000 each for toilet seats, but no one complains when a critical machine part costs \$10,000 even though its true cost of production, in terms of material and labor, may well have been less than the toilet seat's.

Golf balls vary in price from \$10 to \$60 a box, the real difference between them being negligible. But the promise of better mission-critical performance, however infinitesimal, supported by a narrative of technological complexity in the design and construction of the ball, is sufficient to make the higher-priced balls economically viable. What if the other guys use them, as they surely will!? (The use of expensive equipment also gives off other messages: how much one *loves the game* being the main one, which projects power, as well as pure wealth display.)

In democratically elected parliamentary governments, small minority parties can have inordinate power when voting is split and/or when the number of seats held by the majority party is still a few short of 50% of the house, which is (usually) the threshold percentage of the vote required to pass a bill into law. The minority's handful of votes are mission critical.

When workers *strike* (an interesting choice of words), what are they doing but attempting to prove that their work, in aggregate, is mission-critical to the business?

⁶⁸ (Good) things that are about to go, or vanish forever, also suddenly become valuable. It is as though their very vanishing climaxes. The marginalist, however, would argue that these are normal goods whose increasing and imminent absolute *scarcity* is driving up their value.

⁶⁹ See Richard H. Thaler, "Calendar Effects in the Stock Market," being Chapter 11 in his book *The Winner's Curse* (Macmillan: The Free Press, 1992), 139--150.

⁷⁰ In Mexico, a "cardiac aspirin pill" is sold at a price orders of magnitude higher than ordinary aspirin pills, even though it is a nothing other than a low dosage of ordinary aspirin (150mg). The cardiac pill, you see, protects against *heart attacks*; the ordinary aspirin helps only headaches.

⁷¹ For a commendably clear rendition of this view, see Willard Gaylin, "Faulty Diagnosis: Why Clinton's health-care plan won't cure what ails us." *Harper's*, October 1993, p. 57 ff. As of this writing (1998) the saga continues as Health Maintenance Organizations (HMOs) placing greater and greater restrictions on what doctors may or may not do, pass some of the savings on to consumers, but take most of them for themselves. This has led to a massive transfer of income (and control) through the 1990s from doctors and hospitals to the directors of insurance companies and HMOs and their stockholders. There is some question as to whether the trend can continue, however, since a good proportion of HMO profits have come from signing up ever more members and using this fresh income to pay for services to existing members. This represents a chilling similarity to a Ponzi scheme (see Chapter Seven, Note....), in which case the whole system may well collapse when HMO membership-growth levels off to zero and demand for medical services increase the way they are expected to (due to ageing of the U.S. population).

Why do hospitals and doctors (diplomatically) not offer their patients lower fees in return for limits on their ability to sue for malpractice?

It may well be because the urgency or pre-potency of survival outweighs such considerations. The value of satisfying our momentary need for survival holds us hostage to whatever deals come our way: "your money for your life." The actual situation is more complicated than this to be sure, but this underlying asymmetry of needs in the exchange mechanism between doctors and patients makes such inefficiencies and abuses as there are in our health-care system possible, even inevitable. It is an economic truism that, relative to a fixed, given "supply," increasing "demand" drives up prices.

We shall have reason to examine this formula quite critically soon as we try to re-open the question of the relationship of *value* to *price*. But here, with the example of health care, we can already see that "demand" cannot be understood as the simple quantity we normally take it to be (as in the standard definition "the demand for good *x* at price *P* is the total quantity of good *x* that could or would be sold at price *P* if offered"). "Demand" must take into account also (i) the urgency of the needs involved for both parties, i.e. "buyer" and "seller," (ii) those needs' comparative and absolute positions on the stratigraphy, as well as (iii) the peculiar dynamics of those needs' satisfaction in a psychological and social context more intricate by far than mere competition for a limited "supply" of the good that would satisfy it. In Chapters Eight and Nine we investigate these principles in more detail.

⁷² This effect in the New York marathon of 1995 is clearly illustrated by Hubert B. Herring's analysis in his "Mind over Muscle," *The New York Times*, November 19, 1995, p. E2.

⁷³ In the film *Hoffa*, a young Jimmy Hoffa gives his soon-to-be-lifelong associate a business card after giving him a truck ride. On the back of the card Hoffa writes: "*Give this man anything he needs. Jimmy Hoffa.*" needless to say, this small card comes in handy at crucial moments through forty years of Teamster affairs. I assume the story is not apocryphal.

⁷⁴ We have already "lived" this idea in our discussion of value in information-theoretical terms in Chapters One and Two. There, organization, R , was defined as a difference between two complexities, *actual* and *potential*, and while we allowed that the maximum possible physical complexity of a system was something objectively determinable only given certain decomposition rules (for example, what scale of event or piece would count as a unit "part"), potential complexity stood as a measure of the system's maximum complexity "as far as we were concerned," quite on a par with our knowledge/intuition of its actual complexity. When we proposed to define value in the broadest sense as a change in complexity-and-organization, Ω , therefore (which was, in turn, the geometric mean of organization, R , and actual complexity, C) we were already invoking the assessment of "potentials" which, by definition, exist only in possibility. Moreover, if we can agree that the complexity of a decision has everything to do with the number of options we face and with the lack of reasons to choose one option over the other, then we might ask: what is an "option" if not an action that exists in potential, in the future, as a possibility...which is to say, does not properly *exist* at all? From games of chess to real life, then, every action with valuation requires an assessment of possible future states of affairs and the measurement of quantities, extents, and maxima, such as S_{\max} , which exist only potentially. And what is a "range" of options if not an *imaginary* field, no matter how rationally we lay it out and populate it with options? And yet, for all this unreality and immeasurability, few would deny feeling quite viscerally the cognitive load imposed upon us by decisions-needing-to-be-made, by options needing to be "weighed." It is as though thought had mass.

⁷⁵ Two-term New York Governor Mario Cuomo (quoted in *The New York Times*, December 27, 1994, p. A10), when asked to look back over his career, responded in this way to critics who might say of him that "(he) didn't produce what (he) inspired us to think was possible: "Now *that* one I've always had particular difficulty with. Because if I were Governor for 50 years, I would never have produced what I said we were capable of. Because part of the game is to lift the bar. Part of the effort is to keep moving us forward. To do that you never arrive. You keep saying: "We can do better than this."

⁷⁶ Freud referred to this phenomenon when applied to social relations as "the narcissism of small differences." Here, the differences between groups (or individuals) in conflict, be they cultural or physical differences, are immensely magnified in order either to maintain the motivation to achieve perfect equality or justice, or to "prove" the intrinsic superiority of one group (or individual) over another. Throughout history, no end of harm has been done in the name of these ideals, of course, and almost no group of people has not, at one time or another, been isolated and vilified for differences which at other times and places would go unnoticed or be deemed unimportant. And therein lies the rub: what differences *are* "small" when, as the bigger ones disappear, smaller ones take their place and seem big? In the realm of connoisseurship, the process is to be welcomed. But in the realm of social relations operating at the strata of legitimacy and below, it is dangerous. There, some low level of *inequality* in power and prestige must always be tolerated—be regarded as natural.

⁷⁷ For example, Thomas M. Powers, *The Economic Pursuit of Quality* (Armonk, N.Y: M.E. Sharpe, 1988); and Herman E. Daly, *Beyond Growth: The Economics of Sustainable Development* (Boston: Beacon Press, 1996).

Recall the distinction, reported in Chapter One (p. 18), that biologists make between *assimilation efficiency* and *net production efficiency*. Qualitative growth is a manifestation of assimilation efficiency; quantitative growth a manifestation of net-production efficiency. Only the first is evolutionary in the sense of increasing the complexity-and-organization of individual organisms and new species. We will come back to this in Chapters Eight and Ten.

⁷⁸ See for example Denise Breton and Christopher Largent, *The Soul of Economies: Spiritual Evolution Goes to the Marketplace* (Wilmington: Idea House Publishing Co, 1991), and Andrew Bard Schmoekler, *Fool's*

Gold: the fate of values in a world of goods (San Francisco: Harper and Row, 1993). Any number of books critical of the marketplace share the "anti-quantifying" (and often anti-science) view to some degree. We make note of a few more of them in later chapters.

⁷⁹ The choice of "salted peanuts" to stand for addictions in general was my own—or so I thought. It turns out that the great behaviorist Donald. O. Hebb used it first—the "salted-nut syndrome" he called it—in *The Organization of Behavior* (New York: John Wiley and Sons, 1949), a fact brought to my attention by reading Tibor Scitovsky's *The Joyless Economy*, p. 63. Either it is a rather obvious simile, or I heard it in graduate school.

⁸⁰ It should not go unremarked upon that *education* is not so different an enterprise, relying, as it so often does, on generating a feeling of ignorance, the salve for which, of course, is more education.... Likewise, the zealous lawyer might reveal injustices and opportunities for reparations far beyond those that brought his client in to see him in the first place.

⁸¹ Philip J. Hilts, "Is Nicotine Addictive? It Depends on Whose Criteria You Use," *The New York Times*, August 2, 1994, p. B6. By 2000, it was clear that the argument by the tobacco industry that cigarette smoking was not addictive was lost.

⁸² The economic approach to addictions, which seeks to show that—and how—levels of consumption of addictive goods responds "rationally" to price variations, has used cigarette addiction as a test case. This research shows that cigarettes are indeed addictive in as much as the price elasticity of the demand for cigarettes is considerably lower in the short run than the longer run, especially amongst the young and poor. In other words, small changes in cigarette prices today have little or no effect on present consumption (i.e. on people are already hooked), but those changes have growing effect over time as newcomers-to-smoking decide to *begin* the habit, or not, based on affordability.

This research, chiefly by Gary Becker and co-workers, is recent and ongoing as of the time of this writing. For a review of progress, see Michael Grossman, "The Economic Approach to Addictive Behavior," in Mariano Tommasi and Kathryn Ierulli, *The New Economics of Human Behavior* (New York: Cambridge University Press, 1995), 157–171.

⁸³ From Grossman (1995) op. cit., p. 160. (My italics)

⁸⁴ George J. Stigler and Gary S. Becker, "De Gustibus Non Est Disputandum," *American Economic Review* 67, March 1977, 89.

⁸⁵ Here are some closer observations on the differences between addictive goods and the needs they (dis)serve.

Withdrawal from certain drugs, such as heroin, challenge one's sense of security and survival: paranoia combines with racking physical illness that will propel an addict into criminal and often life-risking behaviors in order to alleviate the feeling. Warmth, calmness, drowsiness, and feelings of safety (security) are heroin's "positive" satisfactions. *They are the very balm, that is, for heroin's withdrawal symptoms.* Tolerance also builds quickly, as we would expect from satisfaction waves that dip deeply below *S*-necessary for long periods.

Alcohol behaves in similar ways.

Cocaine, on the other hand, offers a euphoria akin to feelings of confidence and freedom. It dissipates quickly and the withdrawal phase it creates is short-lived and shallow, "purely psychological," a sort of regret that ordinary life is so lackluster. Like the reward it offers, withdrawal from cocaine lies at a higher stratum of needs. It plays with the "smaller chips" there, and is thus easier to recover from. The greatest harm done by cocaine and crack cocaine (a more purified form of cocaine)—aside from the financial and social harm that comes from offering instant, temporary feelings of well-being to people who have more serious deficiencies lower on the stratigraphy—is chiefly through seizure or cardiac arrest due to overdose. People try for higher highs and/or higher frequencies of dosage to stay high, but the toxic metabolic effects of the drugs take over. Exeunt survival.

Nicotine—or rather, cigarette smoking—seems to operate in the upper range of the stratigraphy of needs too. The cocaine-like charge provided by the chemical nicotine is tiny, however, when compared to the legitimacy-through-freedom pleasures which smoking provides. To wit: a cigarette is both "something to do with your hands" when in company, and provides quasi-animate companionship when alone. Ritualizing, and thus controlling, hand gestures through smoking, is a way of taking command of their inadvertent message-giving capacity, and thus their capacity for betraying feelings and attitudes. Smoking also has a calming effect in the way it regulates breathing. It proves not only that we are *free* (to smoke at all, that is), but provides—in the precise how-and-when of lighting up, puffing, inhaling, flicking off ash, and stubbing the cigarette out—a universe-in-miniature of autonomous action on our part...and a play, a tragedy, a little plenitude—birth through death—of the cigarette itself, into which we had breathed life.

Cigarettes also function to mark the passing of time; good reasons for taking a break from a routine activity. Smoking cigarettes allows us to imagine an association with pre-1970s movie stars and, largely through this association, to display (if not actually feel) "cool," i.e., to display enough confidence-under-duress *to smoke*. Cigarettes can also become tokens quite literally: gifts to other smokers ("...cigarette?"), with a variety of meanings centering around approval, and traded to the point of become a kind of currency. The gesture of lighting a cigarette for another person, or having it lit for oneself, represents a moment of interpersonal regard which the demise of smoking as a cultural habit will leave the culture poorer.

For the classic study of cigarettes literally becoming currency during prisoner of war camp internments, see R. A. Radford "The Economic Organization of a P.O.W. Camp," *Economica*, New Series, vol. 12, November 1945, 189-201. Something similar I believe happens—or should I say *happened* before the social ostracism of smokers became widespread, at least the United States—in everyday life in a community of smokers. The trading of cigarettes becomes largely psychoeconomic: always having them to offer makes you seem magnanimous in general—a sign that can become expensive with cigars!—and never having them makes you a "bum." The lore relating to cigarettes and smoking is endless.

In sum, to give up smoking is to suffer a large number of psychoeconomic mini-withdrawals, the least of which may be withdrawal from the subtle physiological rush provided by the chemical nicotine itself. So integrated is it into the social sphere that giving up alcohol shares in many of these "mini-withdrawals," over and above its more physical component. Giving up Mozart has none of these problems.

Does knowing which need(s) a particular addiction, bad habit, or unhealthy obsession satisfies help us cure it? One would hope so—in so far, at least, as it helps us identify what might work as a substitute. For example, caffeine does not help kick the alcohol habit, chewing gum does not help the quitting smoker very much, and compliments from an unwanted suitor cannot be converted into compliments from a wanted one. *Distractions* are not substitutes, though they may help us with addictive behaviors by allowing enough time to pass for withdrawal feelings to subside of themselves.

But let us look a little further into just how need-specific some common addictive behaviors are.

People often speak about "good addictions," of course, like working productively, or playing a sport, practicing a hobby, being helpful, eating healthful food, loving Mozart, and so on. These are simply habits and obsessions the exercise of which generally leave us, and others around us, if not better off then certainly no worse off. They are also ones in which "doing it again" is not necessarily the solution to waning satisfaction. The lassitude that follows sex for example, is not cured by engaging in sexual activity again, nor is the weariness of the runner relieved by running farther. Indeed, sex, like food, leaves one *disinterested* in repeating the experience anytime soon. We can only wait for our appetites to return in their own good time. Here, satisfaction rules almost

in spite of ourselves.

Spending money, on the other hand, *can* be addictive. Shopping sprees create a "high" in the shopper the aftermath of which, for some, is not a gradually ebbing satisfaction but a vacuum of pleasure, withdrawal, a feeling which is unalleviated until the shopper, specifically and unsubstitutably, is shopping again.

The gambler finds that the more money he loses at gambling, the more he must gamble to regain his losses. He comes to believe that runs of bad luck must end soon, while runs of good luck indicate that he is charmed. In either case, he should, specifically and unsubstitutably, keep gambling. It would be interesting to stage an experiment wherein gamblers were offered various amounts of money to stop gambling. The true addict would probably not stop for any amount short of a large multiple of what he stood to win if he continued to gamble. The gambler, after all, plays with God posing as Lady Luck. It is God who must show His/Her approval of him, not some meddler-with-an-agenda bringing money to make him give it up. To stop the gambler, the bringer of money would have to be seen by the gambler as God-sent, fortuitous, as Lady Luck in yet another guise...this in order to satisfy his need for cosmic approval. The subject of gambling returns in Chapter Nine.

The addicted computer game player feels euphoria while winning, frustration at losing. But the game's designers have made the game winnable enough that the player is drawn into ever greater difficulty and "reward" levels, entering deeper into a world of characters and events that the player forgets are of no consequence. Time stops. Friends and job are neglected. The player feels empty until he can return to the game. (Chess can do the same, of course.)

Checking one's mailbox can become a habit or mild addiction of the same sort, especially if it is a public or electronic mail box (since a message might arrive at any time!). If we find it empty then we feel the need to check it again soon; and if we find it full—why then we should check it again soon since this is clearly "a heavy mail day."

Adventure movies, romance movies, rock concerts, TV sitcoms, cop shows, talk shows, MTV, and soap operas...all of these forms of entertainment give us a lift...and then drop us back down into the work-a-day world (or send us to bed) feeling disoriented and vaguely dissatisfied, feeling worse off than when we began. "Come back" they cry like the Sirens, "come back for more." Indeed, watching television itself, regardless of program content, is an addiction. For watching television regularly—watching and waiting for the something grand or funny that is always about to happen—causes the very loneliness and alienation which it temporarily cures. (We touch here upon an enormous topic, and one with an already large literature, namely, the role of television in the larger fortunes of our culture and economy. I can think of no briefer and more level-headed recent summary of the situation than Robert D. Putnam's "The Strange Disappearance of Civic America," in *The American Prospect*, #24, Winter 1996, 34–48.)

All of these behavioral habits, addictions, dependencies—call them what you will—are specific to particular, usually social needs. But it is probably wrong to describe *chemical* additions as linked quite so specifically to satisfying only particular needs. Like bribing the company's chief accountant, addictive drugs seem to operate directly on the part of brain which tallies satisfaction, pleasure, and happiness directly, whatever their source or cause—the very part of the brain, incidentally, which makes it possible to measure and compare the value of x and the value of y at all, "apples and oranges" though they may be. Our energy level and level of optimism too seem to be globally adjustable by chemical means.

⁸⁶ Obsessions, habits, and inordinate weaknesses might be distinguishable from true addictions in this way.

	SATISFACTION		
	Immediacy	Withdrawal	Substitutability/ Convertibility
Addictions	yes	yes	low
Obsessions & Habits	not nec.	yes	low
'Inordinate Weaknesses'	yes	no	moderate
Ordinary Satisfactions	no	no	moderate

⁸⁷ The possibility exists state-registering agents in the brain are nothing more than mathematical *integrators* of the outputs of change-registering agents possessed of a certain amount of memory.

⁸⁸ One way to mathematize this hypothesis: let one's feeling of well-being as a function of S at a given time T be denoted $D(S, T)$. I am suggesting that $D(S, T) = aS + b dS/dT$, where a and b are positive constants. In normal people, $a \geq b$. In addicts $a < b$, at least with regard to certain experiences or chemical substances—which might themselves might be the agents that upset the healthy a - b balance.

⁸⁹ While these remedies were arrived at entirely from our theoretical model, they correspond roughly to certain established practices for alleviating drug addiction: (i) going "cold turkey," the use of (ii) tranquilizers and religion to treat alcoholism, (iii) methadone to prevent heroin withdrawal symptoms and (iv) anti-depressants and mood elevators such as Prozac to stabilize feelings of well-being. Substances such as Antabuse (disulfiram) and CCC to treat alcoholism falls into another category: they cause the drinker to become ill upon consuming alcohol, removing the pleasure wave entirely, indeed inverting it. See William A. McKim, *Drugs and Behavior* (New Jersey, Prentice Hall, 1986).

More recent experiments involve affecting dopamine sensitivity. It appears that addiction-prone people have a genetic deficiency of dopamine receptors. It is unclear from reports, however, whether dopamine levels affect satisfaction or pleasure by our definitions of these terms. The difference is not one that researchers presently look for. Interestingly, however, for recovering addicts, the drug baclofen has proved useful. It "tones down the dopamine system and gives the thinking part of the brain a better chance at remembering the consequences of drug use" and also, presumably, a better chance to count one's blessings, to feel satisfaction, appreciate one's own achievements. This falls in line with our theory. See Linda Carroll, "Genetic Studies Promise a Path to Better Treatment of Addictions," the *New York Times*, November 14, 2000, D6.
