

“Complexity, Value, and the Psychological Postulates of Economics”

Michael Benedikt
University of Texas at Austin

This paper appeared in *Critical Review: A Journal of Politics and Society*, Volume 10, Issue 4, 1996 (551-594) Special Issue: Tibor Scitovsky's *The Joyless Economy* after Twenty Years¹

ABSTRACT

Thinking about how to improve the sad condition of the American built environment requires that we consider generally how "values" enter our economic system. This opens onto discussions of the psychological dimensions of economic value—discussions of just the sort that once animated economic theory and that Tibor Scitovsky wants to keep alive. I examine some of the postulates that underlie the utilitarian approach to value, consider Scitovsky's revisions, and propose a complementary model of value based on modern complexity theory and a Maslow-like rendition of human needs. After exploring some of the more telling exceptions to the law of diminishing marginal utility—namely, climactic goods, gifts that keep giving, goals that keep receding, and addictions—I conclude by invoking Gresham's law to shed further light on the fate of the built environment in a free-market economy.

¹ This document but for one or two phrases and typos is the one published in *Critical Review*. For the notes in place, please consult original printing. Illustrations are available at <http://www.mbenedikt.com/>. At the time of the making of this document, was not available online due to technical problems at <http://www.ciaonet.org>.

"Complexity, Value, and the Psychological Postulates of Economics"

It gave me great pleasure to read Tibor Scitovsky again for these pages. Few, today, are the economists who keep before us so clearly and passionately a vision of the good life, of what prosperity is for, and therefore of what the discipline of economics is ultimately aimed at bringing about.

My own investigations into the foundations of economic behavior sprang from an ambivalence about the fruits of our economic system similar to Scitovsky's. This unease led me into similar biological and psychological territory, and towards similar conclusions. But I have differences with Scitovsky. With deepest respect, I have emendations to offer. It may help if I clarify at the outset what an architect like myself I was looking for in turning to economic theory in the first place.

First were questions about "the slumming of America." With its urban sprawl and endless strip development, with its parking-lot-destroyed downtowns and numbing developer suburbs, with its cracked sidewalks (where there are any at all), weedy parks, and wire-crossed skies, the American landscape is mired in ugliness. For two generations at least the deterioration and cheapening of the physical environment has proceeded in several dimensions simultaneously: the loss of generosity in the size and quality-of-construction of buildings; their reduced complexity and detail of design; the neglect of human scale and socioeconomic variety in neighborhoods and public spaces; the sparse commitment of capital resources to creating new infrastructure and to maintaining the old; the powerlessness of most city councils to restrain developer interests and the alarm of others who stop development completely. Perhaps not coincidentally, all this has proceeded together with similar trends in dress and speech codes, in educational standards, and in much else.

But what have we here but the ineluctable play of "economic forces"? America, after all, is a democracy, one in which people are largely free to do what they wish with their votes, their time, and their money. Here, in the world's premier example of a free-market system, businesses (ironically) must cater to consumers' wishes in any way they can, or die. The consumer is "sovereign." It seems, then, that if the outcome of this combination of desire and manufacture and law is an unlovely and unloved landscape, then people's values must lie elsewhere.

Unlike the economist, the architect gazes disconsolately through plate glass at the parking lot and utility poles across the way. "Unlovely and unloved," he thinks, "a vicious circle." He remembers the cafés and boulevards of Paris and Prague, the park at Sceaux, the towns of Tuscany, the teeming streets of Tokyo with their \$700/square foot buildings ablaze with neon, and as he turns back to the problem of expunging the last dollar of "unnecessary" expense from the project at hand, his mind turns to questioning the "economic forces" that have made this landscape inevitable, to looking for the invisible hand that now guides his hand. What do

economic forces and economic laws have to do with value? Where is the money going?

This second group of questions was easier to answer than the first: the share of GNP going to (non-military) construction dropped from more than 11 percent in 1950 to less than 8 percent in 1990. The number of square feet built per annum increased over the same period from 600 million to 3,500 million square feet. This means that a 600% increase in construction volume was achieved with a 25% decrease in percent-GNP. Efficiency? Enviably "returns to scale"? This is the economist's way to look at it, and the view of one who does not see that the product itself has changed. For it is clear that we are progressively directing relatively less of our total wealth and effort to infrastructural and architectural quality. Over the same period of time, the share of the GNP represented by the banking, real estate, entertainment, tourism, and communication sectors of our economy grew in precisely the opposite direction. My conclusion? Our environment has become ever more commodified, ever more the subject of short term investment and resale rather than lifelong dwelling. To escape our dispiriting environment we go to the movies. We go to Disneyland, to resorts, and to Europe for our fix of architectural interest and beauty. At home and at work, the television—and latterly the computer screen—has replaced the window, just as surely as air conditioning replaced the fresh air that once blew through it.

A true theory of value would help to tell us what is being lost and what is being gained. Such a theory is what we need. If we were to find that the new entertainment and communication media are fulfilling the same human needs as nice buildings and gardens and streets do, or did, then we could lay the architect's fears to rest. To hanker after Parisian sidewalk cafés, Southern front porches or New England village greens, for example, could turn out to be little more than nostalgia in an era when chat rooms, BBSs, and MUDs (Multi-User-Domains) are proliferating on the Internet, providing trans-geographic friendships and virtual community for millions of people. "Value" is the word we use to compare the goodness of things: if we knew how and what we valued, we could be more open about the specific kinds of things that would or should satisfy us. It indeed might turn out that the "real" and the "virtual" are equivalent in value. And amongst real things, so too might horse racing and swamp-buggy racing be of equal value, grand opera and the Grand Ole Opry, the sun sliding slowly across a library floor and the brash, cascading lights of Las Vegas.

Economic Value

So what does it mean for something to have value? Today we have theories of prices, of money, and of market dynamics, but not of *value*; today we have theories of economic value, but not of value per se, which would have to include aesthetic, moral, ecological, scientific, medicinal, and sentimental value, and so forth, all combined and competing with each other. A hundred and more years ago, when

economics was still developing from moral philosophy into "political economy," there was no question that value was the difficult, central, and unifying concept. Political economy was to be the science of value. With the wind of the Enlightenment strong in their sails, practitioners of this science would see human life as a legible whole, all things "good"—save perhaps the most spiritual—emerging from work, from capital, and from productive relations among people. It is to such socially and psychologically based discussions of secular value as H. H. Gossen's *The Laws of Human Relations* (1853) and Friedrich von Wieser's *Natural Value* (1893) that I think Scitovsky wants to return modern economic philosophy—though improved, of course, by what has been learned since.

And what has been learned since? I am not qualified to be comprehensive. But part of the answer has surely to do with a new appreciation of, and new tools to deal with, *complexity*. We have learned that an economy is "a complex system," like anything alive, like a whole ecological system, like a brain. The quasi-hydraulic metaphors that inform neoclassical equilibrium theory, which are as elegant as they are idealized, are similar in many ways to the "psycho-physics" of Freud with its basic drives, forces, sublimation, substitution, cathexes, and equilibrium-restoring processes. (As Philip Mirowski shows, the social sciences have always borrowed from the physical sciences of the previous day, economics more assiduously than most.)

Today, with a small leap of the imagination, we might instead compare economics to psychology. Samuelson's *Economics*, say, can be read as a psychological text—even a neuropsychological text—with the mind's deepest processes unwittingly magnified and projected out onto the world and the relations between people with fractal self-similarity. For the mind is a complex system too, perhaps even a reflection or infolding of the social-economic order, at least in its higher functions, just as G. W. V. Hegel, Karl Marx, G. H. Mead, Lev Vygotsky, R. D. Laing, and most recently, Marvin Minsky, have suggested.

This incautious view has the merit of making the "marriage" of economics and psychology, desired by Scitovsky, and so the return to consideration of the concept of value, seem no strange quest, no fringe pursuit, no attempt at "imperialism" from one field or the other, but an entirely natural enterprise, one that invites discovery and testing. Indeed, considering how deep were Adam Smith and Jeremy Bentham's insights into human happiness, and how early they both were to accept on the one hand the inseparability of politico-economic and social-psychological life and on the other the fundamental "calculative-ness" of the human psyche ("fellow-feeling" notwithstanding), it seems unnatural that economics and psychology have become so far separated.

Readers of Scitovsky will recognize many of the themes and interests introduced above: the call for valuing goods that one must *learn* to enjoy, goods such as complex and difficult music, good wine and cuisine, literature, debate, chess, all of the fine arts (as opposed to mere entertainment) and, despite Scitovsky's limited

focus on the subject, fine architecture. A good society would not only to supply these goods but would educate the demand for them among consumers. Qualitative growth would pick up where quantitative growth leaves off.

There is also in Scitovsky, especially in *The Joyless Economy* (JE), a distinct strain of Europhilia: the Europeans know how to live! Most urbane and educated Americans, and almost all architects, might agree with this sentiment, but not without a certain struggle. Scitovsky struggles too, and with considerable grace. Europe produces Paris and London, and even the New York and Boston of long ago; America, jazz and the movies, to be sure. But physically, materially, and environmentally, our freewheeling ways produce mainly the commercial wastelands of a Denver or Atlanta, a Phoenix or Los Angeles, Dallas or Miami, spreading like prairie grass down shopping strips, shimmering in the haze as far as one can see. How, rationally, can we envy the magnificent material and cultural achievements of two thousand years of European history and yet find totally unsuitable the feudalism, ecclesiasticism, aristocracy, mercantilism, and more or less continuous warfare which brought them about? How are we Americans to take pride in the scrappy, make-do inventiveness of our pioneer culture, with its Puritan asceticism, its common-sense pragmatism, its individualism, egalitarianism, and take-it-or-leave-it attitudes towards everything requiring commitment to anything other than freedom itself...and yet long for the order and quality, the richness and permanence of milieu and culture, associated with European gentility (and its sometime American emulations)?

These are questions that Scitovsky does not tackle directly or extensively. Nor am I able to here. I am nonetheless optimistic that, if its reconciliation we want, then new bases, new incentives, and new arrangements can and will be found within our economic system that will produce, incrementally, the best of both worlds, Old and New. And if this is what we want, the way there begins, I believe, in an examination of our economic system through the lens of a modern, psychologically-based theory of economic value of the sort that Scitovsky seeks to establish.

Writing JE in the early 1970s, Scitovsky could not foresee the turn towards "European-style" sophistication that would be undertaken by large numbers of the *nouveau riche* and even the not-so-riche of the 1980s: towards foreign luxury cars (mostly leased), wine, ballet, opera, and classical music stations in every medium-size city, towards gourmet groceries and restaurants, new museums, postmodern classicism in buildings and furniture, adventure tourism, and a certain Wildean enjoyment of fashions and fads in general. Scitovsky admits as much in his Preface and Appendix to the 1992 edition of JE, turning our attention instead to the problems remaining among the lower middle classes and the rural and inner-city poor: lives numbed and dumbed by television, surrounded by mass-produced gewgaws, prison-like schools that put students' *self*-regard above academic achievement, chronic under- and unemployment, demoralization, family breakdown, crime, drugs. Startlingly, Scitovsky lays the blame for most of these problems at the feet of *boredom*, the boredom caused by too much comfort (x-xi). "Poverty and miserable living conditions" are factors too, Scitovsky admits, but boredom is the

real culprit: the poor in America have too much time and not enough meaningful to do with it, and so they "look for trouble."

One begins to wonder: shall bread and circuses be the solution, again?

Of course, exploring the problems of poverty and crime was not Scitovsky's purpose in writing JE. He was interested, rather, in the vacuity of middle- and upper-middle-class life in America, an interest that was not (and is not) his alone. And yet, the fact that he goes on to suggest nonetheless, in the revised edition of JE, that what might come out of reading JE still is how boredom creates the problems associated with *poverty* raises, for me, some deeper questions about his theoretical orientation.

This orientation, as I read it, is marginalist or neoclassical utilitarianism, except that Scitovsky posits optimal stimulation, or "pleasurable excitement," as a need in itself. This assertion is based largely on the findings of the physiological psychology of the 1960s and 1970s. Here, I believe, we can begin both a critique and an appreciation of Scitovsky's thought.

Happiness and Utility

In conventional marginal utility analysis, the word "utility" does double service: it is both an attribute of an object that satisfies or goes some way towards satisfying a human need, and an attribute of the person experiencing the satisfaction: one "enjoys" greater "utility" when one consumes such and such quantities of goods x and y . The first usage—that something has utility if it satisfies a need—is to my mind more felicitous, and I shall try to stick to it.

According to marginal utility analysis, the utility, to a given person, of a series of similar goods does not generally increase linearly with the number or frequency of the goods he or she consumes. Rather, as with a bowl of soup, the last few spoonfuls contribute less to their feelings of satisfaction than did the first because the feeling of lack or need—in this case the feeling of hunger—is progressively lessened. In general, the "marginal utility" of a good—the value of its last-added unit—decreases as the total number units which have already been consumed increases. This gives us the rule, or "law," of diminishing marginal utility, usually attributed to Hermann Heinrich Gossen, who (around 1858) called it the Law of Satiabile Wants.

The fundamental form of this law, however, was produced in 1730 by the polymath Daniel Bernoulli. He suggested that the economic significance of a unit of money income is inversely proportional to the amount of money one already has, and he gave it a strict formulation. This view (and its formulation), became the basis for the Weber-Fechner "Law of Just-Noticeable Differences" in experimental 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 subjective sensory experience of it. Hence Figure 1.

(Place Figure 1 about here)

In all these cases, increasing the intensity of "input" to the human perceptual/valuational system was demonstrated or asserted to be ever less effective. Conversely, experiencing equally large gains in effect was said to require ever larger intensities of objective input.

Let us, for now, accept these assertions.

What happens, one wonders, if inputs become arbitrarily intense. Surely, in many cases, satisfaction or utility will not just become asymptotic to, or approach, some maximum. Rather, it will decrease again: curve down. Take the example of food: eating beyond satiation will make one feel ill. Similarly, a caress endlessly repeated becomes painful; something too exciting becomes frightening. Light can blind, sound can deafen. It would seem, then, that for any sensory or valuational computation where the optimum of subjective effect occurs at less than the fullest possible intensity of input, we must have a curve something like that shown in Figure 2.

(Place Figure 2 about here)

This "inverted U" curve, also known as the Wundt Curve or the Yerkes-Dodson law, clearly does not apply to all goods: it seems that one can never have enough money, for example, or wisdom; but it does seem to apply to many other goods, and certainly to the ones that interest Scitovsky.

I have left the Y- and X-axes generic and unnamed in Figure 2 in order to explore what I believe are some confusions in Scitovsky's assignments of meaning to the Wundt Curve vis a vis economic value. For Wilhelm Wundt, the X-axis plotted stimulus intensity, and the Y-axis pleasantness (with $y < 0$ denoting unpleasantness). For Scitovsky, via Daniel Berlyne's work in aesthetic perception, the Y-axis continues to plot pleasantness-unpleasantness as before, but the X-axis plots stimulus newness.

For Robert Yerkes, the X-axis plots arousal and the Y-axis performance efficiency. As the level of arousal increases so performance improves—but only to a point. Beyond this point, more arousal leads to a deterioration in performance due to anxiety or stress. And what is "arousal"? It seems that the brain has a group of neurons called the reticular activating system along the center of the brain stem running from the medulla to the thalamus. This system is responsible for changes in the brain's overall level of wakefulness: from sleep to excitement, from vague inattention to the world to attention focused upon some salient feature of it.

Now, what Scitovsky, the good marginalist, asks us to do is pay attention to the changing slope of the Wundt Curve given by the differential dy/dx . We note that the slope is horizontal, i.e. $dy/dx = 0$, when y is highest, that is, when arousal

(stimulation, newness...) is neither too much nor too little but "just right" to achieve maximum performance or maximum pleasurable feeling: the Middle Way, the Golden Mean, Goldilocks' Baby Bear...and Mihaly Csikszentmihalyi's "flow" (to which I shall return). Scitovsky now renames the Y-axis "comfort." He then calls all rightward "motion" towards maximum comfort from the left the pleasure of "stimulation," and all leftward motion towards maximum comfort, somewhat confusingly, the pleasure of "comfort." That is to say, stimulating pleasure consists in moving towards greater arousal from sub-optimal levels, and comforting pleasure consists in moving towards lower arousal from beyond-optimal levels. Pain (or displeasure) is simply movement in the opposite, less-optimal, direction (from the same starting points). The outcome of this process is that when one has reached the optimal level of comfort, y_{max} , one feels neither pleasure nor displeasure, just comfort. Scitovsky is here, in effect, restating Spinoza's definitions of pleasure and pain:

PLEASURE is the transition of a man from less to greater perfection. PAIN is the transition of a man from greater to lesser perfection....I say transition: for pleasure is not perfection itself...Neither can we say that pain consists in the absence of greater perfection. For absence is nothing whereas the emotion of pain is an activity; wherefore this activity can only be the activity of transition from a greater to a lesser perfection—in other words, it is an activity whereby a man's *power of action* is lessened or constrained.

Note Spinoza's emphasis on movement, on transition, "slope." I highlight the phrase "power of action" in this passage in order to point out its affinity on the one hand with the concepts of optimal arousal, performance, and flow, and on the other hand to begin to question whether Scitovsky has not lost too much by collapsing such concepts into "comfort" or the lack of it. For what is puzzling is that at many points in JE, Scitovsky will not have much good to say about comfort as a worthy goal. This was certainly not true for Spinoza, for whom "perfection" was the ultimately worthy goal, admitting of infinite degrees, and of which one could not have too much.

Now briefly to "flow." People are happiest, writes Mihaly Csikszentmihalyi, when they are engaged in activities that are neither too easy nor too difficult for them, when their skills and the challenges that meet them are matched, and both increase in tandem over time. This is "flow," portrayed in Figure 3.:

(Place Figure 3 about here)

Ideally, as one's skills increase, one seeks new challenges; as challenges increase, one seeks new skills, all the while trying to stay in the satisfying, even euphoric, "channel of flow" where work is not labor at all and feelings of pleasure and accomplishment commingle.

Scitovsky and Csikszentmihalyi, although they do not cite each other, have much in common. Both take an essentially information-processing view of value; both cite

Berlyne and others in the field of aesthetic perception. Both want to recast work as a source of meaning and pleasure rather than as a "disutility." But what is appealing in Csikszentmihalyi is something that is missing in Scitovsky, namely, a sense of absolute progress or evolution: in social arrangements and in individual consciousness, in movement toward the greater complexity and organization of life and thought which, I would suggest, constitute Spinoza's "perfection." For Scitovsky, comfort as a goal represents a pleasure-less, indeed "joyless," dead end. We are therefore properly to value pleasure as much as comfort, if not more, which means we are to be situated as much as possible on the *slope* of the Wundt Curve, preferably on the left, increasing-stimulation, side. This is the dynamic element in Scitovsky's theory that is intended to encompass "human growth." But his theory seems to lack the extra dimension required to handle it, either a hierarchy of needs, and/or a way to speak about "increasing optimal levels of comfort."

These two ideas can still be improved upon, as I hope to show, but they already suggest a picture more like Figure 4. Here, any movement from point A, which is optimal, to a point in the shaded area would be pleasurable even if the second point were sub-optimal with regard to the new Wundt Curve it lay on (and which might belong to a higher need or activity). Then, indeed, valuing pleasure over comfort would be sound strategy once more, aimed, ironically, at comfort again...but *comfort of a more complex sort*.

(Place Figure 4 about here)

Something like this is already happening in Csikszentmihalyi's representation because the Z-axis, coming out of the page as it were, is complexity—"good" complexity, enriching complexity—of just the sort Scitovsky advocates throughout JE. In Csikszentmihalyi, "flow" substitutes for "comfort"—it is the "good place to be"—but without Scitovsky's attribution of passivity or stasis to this place. Flow is a continuously pleasurable doing/thinking/growing. It is not a point of zero slope on the crest of a Wundt Curve, which one must renounce so as to climb toward it again and again like Sisyphus, nor is it a futile running-in-place. It is an always-comfortable, rewarding "channel" of activity, intrinsically allowing real progress rightward and upward.

Scitovsky might want to respond that the need for stimulation he posits is just the thing that drives people into the "flow channel." But this response would require Scitovsky to revise his notion of comfort. Comfort itself must be situated on a slope in another dimension. In JE, Scitovsky introduces a simple, hierarchical partition of needs, I think, precisely in order to avoid this option. First he identifies comfort with easily satisfied physical needs, such as for food, water, warmth, and sleep. Then he asserts that all other and higher needs—for conversation, music, social status, fun, luxury, and so on—reflect our need for stimulation, for greater arousal. This leaves no room for the idea of higher comforts, and seems to me to short-change Scitovsky's own insights. Dozing contentedly at the opera is much different from dozing contentedly on the sofa, though they are comforts both. Three

Asparagus Napoleons with Oriental Black Bean Sauce are more satisfying than three hot dogs with ketchup and relish not because, or only because, they are more "European" or more interesting in the eating, but because the level of comfort—of savoring—achieved upon having eaten them is that much richer and more complex, too.

Without adding this third dimension of complexity, i.e., without allowing for higher comforts, the older idea of (positive) marginal utility (which states that an *increase* in total utility, not its total quantity, is the measure of value) already has within it much of what Scitovsky suggests about "motion" and "stimulation." His theory would then amount only to pointing out that utility curves can sometimes arc downward upon overconsumption.

Value and Complexity

One approach to value would define it in the most universal terms: value accrues to anything that increases the life-time of the living system on behalf of which that value is judged. By "life-time" I mean the mathematical product of "life," meaning vitality or lifefulness, and time. By the measure of life-time, a short, complex, and intensely lived life is equivalent to a long, simple, and comfortable one; and a "full life" is of greater accumulated value than an equally long, empty one.

Now time, being measured in minutes, hours, years, is not very problematic. But how is one to measure the "amount of life" in a person or group, or, for that matter in a city or ecosystem? Restricting ourselves to persons, we can see how "arousal" (or "reticular activation level"), the "power to act," "efficient performance," "pleasurable excitement" and "flow" might all be pointers to this more fundamental variable of lifefulness: a mind and body somehow working together at peak complexity with little or no error. Intelligence, attention, brightness, skill, acumen, insight, vitality, achievement, capability (this last is Amartya Sen's desideratum)... near synonyms proliferate for what we all intuit as life in its most human and also universal, burgeoning form. Riding atop this ocean swell, surfing with skill and joy, seeing all there is to be seen, feeding and at the same time shaping the flame within us so as to burn as brightly and shine as far as and for as long as possible...metaphors, too, proliferate. What else is there to want? What else has value but that which helps us do these things, for ourselves and those we care for?

The economists' staid stand-ins for value, i.e., utility and marginal utility, are not wrong; they just lag behind the expanded and richer conception of lifefulness and life-time.

In fact there are many measures—biological, psychological, economic, and sociological—of "lifefulness," and the problem at the theoretical level is to put our finger on what they have in common. What they have in common, I believe, is the property of complexity-and-organization. As the biologists Daniel Brooks and E. O.

Wiley argue, life itself is matter and energy and information brought together in patterns becoming more complex-and-organized through the process of evolution. With long setbacks and sudden steps forward, to be sure, the complexity-and-organization of life on earth on average increases with time. DNA strands lengthen, the number of species increase, populations increase, new ecological niches are formed and occupied; labor "divides," markets grow, communication intensifies, the body of law swells, products and opinions proliferate, technology complexifies and simplifies... These are broad brushstrokes, of course, but necessary given the space available here.

Brooks and Wiley propose that we visualize the broad evolutionary trend along the lines depicted in Figure 5.

(Place Figure 5 about here)

I offer, as fundamental to theory of value, the assertion that anything that contributes to this trend towards greater complexity-and-organization, or rehearses it in microcosm, is judged as having "value." And should be.

In Figure 5 we see how some information-theoretical concepts can be used to advantage. Complexity is identified with two entropies, potential and actual. Organization is then defined as the difference between these two entropies or complexities: when the actual complexity of the system is less than it could be, due to constraints upon the number of states it can occupy and/or the frequency with which it can occupy them, those constraints are what organize it. What Brooks and Wiley propose is that in living, evolving systems, all three—potential complexity, actual complexity, and organization—increase with time, as Figure 5 illustrates. What is more, a particular proportion between them is more or less maintained. For if actual complexity comes too close to potential complexity, organization approaches zero and the system becomes chaotic and falls apart. If actual complexity falls too low, the system freezes up; organization is too great. But in the middle, life goes on: Goldilocks redux. (For a more detailed rendition of this line of thought, see Appendix I.)

Value and Needs

Scitovsky does not develop a hierarchy of needs in any systematic way, providing us instead with a simple partition between comfort and stimulation needs and the goods that satisfy them. Most economists are wary of structured need hierarchies—Abraham Maslow's being the most commonly noted and then passed by—and Scitovsky is not much different on this score. Economists prefer to think that human "wants" are indefinitely many, and then concentrate on the myriad goods that these wants call forth in the marketplace. When pressed, they will divide (consumer) goods into two kinds: necessities, which primarily satisfy our satiable physical and biological needs, and luxuries, which primarily satisfy our allegedly-insatiable

"higher" needs; and here Scitovsky follows orthodoxy. But this is still too "psychological" for many economists. For them, necessities are simply identified as those sorts of goods upon which, on average, the rich spend a smaller percentage of their income than do the poor, and luxuries as those upon which they spend proportionately more (sometimes called inferior and superior goods). Hard-headed economists need only look at charts comparing household budgets across income levels to determine which goods are thought of as luxuries and which not. Preferences are to be "revealed" by behavior, not posited by some normative psychology.

Scitovsky is justifiably unhappy with relying on such after-the-fact statistical analysis alone, and proposes that we look again at Ralph Hawtrey's 1925 distinction between "defensive" and "creative" products. Defensive products are those that prevent or salve pains; creative products are those that procure positive pleasure. This division maps nicely onto Scitovsky's comfort/stimulation distinction, and together they make for some interesting psychological speculation. But, for all this, the defensive versus creative (comfort versus stimulation) distinction, like that between necessary and luxury goods, is still a simple dichotomy where there ought to be room for many more distinctions: between many kinds of goods, between many kinds of pleasure, and between many human motivations. Without such an expansion of categories, we are again restricted to a couple of Wundt Curves and really have nowhere to go with them—except perhaps, as Scitovsky does, to berate Americans for spending too much time and money over-satisfying their immediate needs for comfort and convenience.

Even Bentham listed some 100 "springs of action" in his 1789 *Table of the Springs of Action*, belying the modern opinion that he crudely collapsed all human motivations into two—the achievement of pleasure and the avoidance of pain—as though these two were singular, and the only motivations we had, rather than the felt sign and outcome of the success or failure, respectively, to satisfy a hundred more specific and yet quite universal needs and wants, some honorable and some not. More recently, David Braybrooke has identified 12 panhuman needs, while Robert Kane has compiled a plausible list of 32.

Any long list of needs, values, or motives, of course, will have specific, socially constrained relations between them and will generate, in their actual pursuit by individuals, a rather complex social machinery. As Braybrooke and Kane point out, it is because of these constraints that most of us could not enjoy an ice cream cone while a hungry child looked on, could not feel free if our families were in danger, could not appreciate someone's art if we knew that he had bribed the gallery owner to show it, and so on. It is because of the complexity and structure of value systems that we must all pay a great deal of attention—if unconsciously—to their instantiations, to how the game of life is played, rather than to our pleasure and pain as such, which only constitute the score card.

Might there lie, somewhere between 2 and 100, a manageable number of distinct needs which, properly arrayed, would give us a basis for productive discussion? I think so. Maslow's five needs formed the basis for a very productive theory and style of practice known since the 1950s as "humanistic" or "value psychology." Maslow was no Freud, but his perspicacity should not be overlooked.

Based on Maslow, I propose a set of six needs, organized in a "stratigraphy" (whose geological connotations I prefer to the political and power connotations of "hierarchy"). These needs are largely psychological, or rather, rapidly become more psychological as they rise up the stratigraphy. This is not the place to discuss them at length, or even to persuade the reader of their accuracy and usefulness. But in order to proceed with some understanding of what I am offering in response to Scitovsky, I must list the needs and then indicate how they "work." Beginning with the highest needs, they are:

6. The need for freedom
5. The need for confidence
4. The need for approval
3. The need for legitimacy
2. The need for security
1. The need for survival

Some observations: As with Maslow, the lower needs take priority over higher ones in this sense: they are to be substantially if not completely satisfied before moving on to satisfying higher needs. Any threat to the existing level of satisfaction of a lower need will likely discomfit one far more than the same degree of threat to a higher need. Finally, it must not be thought that once a need is largely satisfied, no more is to be done about it. Against the natural tendency to disorganization and chaos on the one hand, and the equally natural tendency to routine and rigidity on the other, adult life is such that all needs require constant and conscious tending to be satisfied. Periodic if not continuous efforts are called for to maintain, let alone improve or optimize, the social arrangements, as well as psychological, material, and monetary income flows, by which needs are met. Reaching the top of the stratigraphy thus entails living a very complex-and-organized life, a more life-full life, and very likely a longer rather than shorter one. This is absolute progress. What contributes to it has value.

A more detailed description of how the needs "work" is sketched in Appendix II.

Exceptions to the Law of Decreasing Marginal Utility

Scitovsky introduces the Wundt Curve of Figure 2 to supersede the standard utility curves of Figure 1. Many economists would argue, however, that nothing dramatic is going on: such curving-over utility curves arise naturally whenever an increasing total cost is somewhere being factored into a computation of net total utility. Does

this exhaust the possibilities? Is the law of diminishing marginal utility universal, especially when modified to reflect "net" marginal utility?

It is not, as many critics of conventional business economics (including Scitovsky) have pointed out. Gary Becker and his associates, for example, have for some time now experimented with models of consumption of certain goods that included, as part of their utility function, the increased ability and/or appetite for consuming more of the good. These are goods or activities one "develops a taste for." They can range from playing golf or going to the opera, to gambling or taking drugs. Upon reflection, one realizes that goods that do not to some extent also train one in their future enjoyment are actually few and far between. Man is nothing if not a learning animal, and what gives him pleasure he will learn to do again. Smith, Bentham, Mill, and Marshall all noted that the necessary capacity to enjoy life's pleasures begins in many cases simply in the tasting of them, and that this capacity is increased not only through formal education in their respective "arts," but through frequent exposure to them and to those who enjoy them. If with every unit good consumed one's desire for, capacity for, and subsequent pleasure in consuming the good increases, then its marginal utility will *not* drop off as the law of decreasing marginal utility decrees it will, but will stay level, or even rise over time.

Most commentators on this "anomaly," including Scitovsky, like to go from this insight directly into a discussion of addictions. I should like discuss addictions too, but not before presenting three other exceptions to the "law" of diminishing marginal utility.

- *Climactic Satisfaction*. Chief amongst examples of exceptions to the law of diminishing marginal utility are sexual desire and sexual pleasure. Certain caresses lead to caresses, the pleasure of each exceeding the pleasure of the one before, until the nervous system reaches a climactic stage of excitation. The satisfaction achieved is total, although it begins immediately to dissipate.

Climactic satisfactions and the catharses that follow them are common in everyday life however. Outbursts of joy and anger, for example, are often manifestations of self-reinforcing accumulations of satisfaction or dissatisfaction that have reached some critical threshold. Political agreements and long-lived insights can be reached after "breakthroughs" that occur only after a "critical mass" of steady or ever-increasing effort at negotiating, searching, or understanding has been invested.

Another sort of climactic satisfaction occurs in the context of goals pursued against deadlines. Here, the goods needed or the actions undertaken as the deadline approaches have more value than those that occurred at the outset of the project. Anyone who has worked in a team towards a deadline—say, the publication of a journal, the staging of a concert, or the introduction 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. Such last-minute saviors understand the "mechanics of value" in such situations all too well and are apt to profit from it. Less

savvy and less rewarded are those who laid the groundwork for the project in the first place, or who worked steadily all along.

A similar dynamic characterizes sports, of course, and all the activities modeled on them, which James P. Carse calls "finite games." Just as the player who makes the winning touchdown in the final moments of a football game is most admired, so the fifth set in a tennis match, the third genie-granted wish, the last word in a debate, the last days of campaigning in a close election, the last tickets for a concert, the punch-line of a joke, all "count" more than their earlier brethren. And just as the climber forced to turn back from the brink of the summit cuts a more tragic figure than the one who perhaps more wisely turned back earlier, so too is the salesman who loses the sale at the last moment a sadder person than the one who was turned down at the beginning. The auctioneer intones "going, going..." and a bidder bursts forth with a higher bid, almost involuntarily.

Consider the technical sophistication achieved by "high-end" tennis rackets, golf clubs, bicycles, fishing rods, and running shoes. Consider the sophistication and expense of modern weaponry. Consider the high prices 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, quarterbacks, and baseball players. 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. The utility curve and the marginal utility curve now both ascend to the right, concave upward, as in Figure 6:

(Place Figure 6 about here)

The same logic also applies to certain activities that are not so explicitly contestatory in nature. The final scenes of a movie, the last pages of a suspense novel, or the last element of a collection of stamps or art or historical documents all have greater value than the first of their kind precisely because the satisfaction of whatever needs they address has been arranged to be climactic. The "calendar effect" on stock prices is also well known: 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. The distribution of finishing times of a marathon race follows a bell curve, the bulk of the runners finishing at the average time. But close inspection of the curve reveals spikes just before all of the hour marks, showing how runners push themselves harder to "come in under two hours," or three or four. Deadlines and thresholds, real or imagined, are always real when it comes to valuation.

- *Gifts that Keep Giving: Generative Goods.* Another exception to the law of diminishing marginal utility occurs with what one might call "generative" goods—goods that, once bought and owned and used remain steady in their benefit over

time, or even increase in the satisfaction (or misery) they give us, rather than decay. Such goods fall into at least four sub-categories:

- (i) Things that are biologically alive and/or growing in some way; for example, a pet, a plant, or a piece of fertile land. In some 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 which some balancing exchange has been made or promised. Some infectious diseases also follow the pattern of this type of "good."
- (ii) Non-living goods that are still extremely complex-and-organized; specifically, goods that contain a substantial amount of information that is dependent on the materialization of certain future contexts for its emergence and relevance. They contain "timed-release" information, if you will. Some examples are: an encyclopedia, a CDROM, an education, a position in an institution, a fine building or artifact, and so on. Each of these satisfy needs as they arise over time and over a number of situations. Physically robust, these are goods that one draws upon rather than consumes, but they do not themselves grow or evolve, as do the previous type.
- (iii) Goods similar to the ones above, but which are not in themselves very "heavy" with stored information. They merely act as triggers or keys in various situations, and repeatedly. Guarantees or land deeds are examples. They are devised to satisfy one's need for 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. "Stay Off the Grass" signs never tire of being officious and grumpy (and sometimes, even keep a few people off the grass). Monuments, flags, and statuary that stand forgotten all year come alive with significance when embraced by an annual ritual. Diamonds emerge on special evenings. Memorable maxims and slogans fall into this category too, as do actions and events whose significance dawns upon one long after the occasion.
- (iv) Goods that 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 goods, access to the Internet, a substantial sum of money...all these are so-called capital goods, and with this thought we have crossed over from consumer economics into another realm entirely, namely, the economics of production. And yet one can give and receive, buy and sell capital goods like any other consumer goods, enjoy them in as much as we enjoy production, and have the satisfaction they give their owners not diminish.

• *Goals that Keep Receding.* Feelings of lack, want, privation, and so on seem naturally to compel us to value most highly that which would relieve us from them most effectively. Conversely, feelings of plenty, satiety, and abundance seem naturally to make us value less highly any additional unit-contributions to satisfying the need in question. Assuming that no cumulative cost is involved or is being counted, the equations and curves that result are the utility curves of Figure 1,

familiar to us from economics textbooks, which become asymptotic to some maximum level of satisfaction, S_{\max} . In real life as in the mathematics, this maximum is never reached, and most of us learn to feel satisfied enough at some level of satisfaction below the theoretical maximum.

Now, not only is S_{\max} an impossible-to-reach ideal, but it is a necessarily impossible one. To abandon calculations using S_{\max} on the grounds that it is a fiction is not realistic at all. It is, rather, to miss the essential role that knowledge and intuitions of ideal, potential states play in our valuational lives. We take particular note of potentials or maxima such as best cases, ultimate pleasures, and other "grand totals" (whether or not they actually occur) precisely for their orientational, limit-setting role. Similarly, 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, we might then 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? And what is a "range" of options if not a purely 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.

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.

We now turn to the question of the *stability* of such potential maxima. One feature of consumer culture has been remarked upon to the point of obviousness: that soon after has one bought, say, a car or a house or a camcorder, one develops "eyes" for a better one. As Groucho Marx quipped upon, clubs we longed to join often turn out to be full of people less admirable than we had imagined: ordinary people, like ourselves. People who rise to positions of power find that there is more power to be had. People who study a subject for a long time often feel that their ignorance has increased: their awareness of the scope of their subject has grown faster than their knowledge, and the goal of complete understanding recedes. Just as the donkey follows the carrot dangled in front of, but always beyond him, so the romantic young man pursues the chimera of the most beautiful girl he has ever seen, who is always disappearing around the corner or into a crowd. The perfect home, perfect sex, perfect food, perfect love, glamour, power, freedom, financial security...images of what these 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 half-knowing that they cannot deliver us from, but only open us to, further desire.

A major effect of all this, of course, is to keep the average slope of the utility or satisfaction curve positive, never allowing it to become horizontal, let alone curve over and down. When goals recede, and with them S_{\max} , we can continue to find

substantial value in striving towards them. We are always "starting out." And who does not love beginnings; who does not thrive on hope? In standard microeconomic terms: marginal utility never falls to zero when the basis for its calculation, privation, is the upwardly moving target of enough. In this mode, the effect of the so-called law of diminishing marginal utilities is indefinitely postponed if not obviated.

Now Scitovsky, like Marx, has no patience for this procedure. The manufacture of impossible dreams and endless new wants, a global industry centered in America, is for him morally tainted from the start: "Market exchanges often create not only satisfactions, but also the needs they satisfy, and anything that gives rise to both a need and its satisfaction is of little or no use to anyone." (JE 134.) Bad. One further strategy for postponing full satisfaction remains, however, to which Scitovsky would have no objection, and which we might call *re-scaling*. Here the almost-horizontal tail of the utility curve is redrawn, as it were, to larger scale, emphasizing the vertical axis. This is illustrated in Figure 7.:

(Place Figure 7 about here)

It is as though a magnifying glass were applied. Within this new and more detailed domain, progress can be made *at a finer scale and with a new sensitivity to detail*. The word refinement is appropriate, implying as it does connoisseurship. At the new level of attention, more frequent tokens, goods, and object qualities at smaller scales become relevant. Into this category 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 utility (or satisfaction) and time. As one approaches an ideal, so the task magnifies and fissionates. 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.

4. Salted Peanuts: Habits and Addictions. Habits and addictions clearly disobey the economist's law of diminishing marginal utility, which, we remember, began as Gossen's "Law of Satiabile Wants." In JE chapters Four and Six, Scitovsky presents a rather general, and for that reason comprehensive account of habit formation and addiction. Here I will try to supplement it.

As many have pointed out, addictions can be good or bad—for us, and for those around us. Obsession with some inquiry or pursuit often shades into addiction, and there can be no superior art or scholarship without this good sort of obsession. Addictions to heroin, cocaine, and other drugs are universally judged as bad, but we think of addictions to sugar, alcohol, caffeine, and tobacco as not-so-bad, and call them "habits."

Scitovsky argues that habits are hard to give up because they offer security. He is right: repeated, reliable, and effective behaviors are both comforting and psychically "low maintenance." Although they may start out as trivial in the pleasure they provide—a fillip of confidence or freedom here, a nod of privilege there—with repetition and robustness they soon descend the stratigraphy of needs: it is easy to feel secure when even "unimportant" routines stand up to perturbation. But one's need for security, and the search for it, is not ipso facto addictive. Security is just a lower and very important need—one upon which, using my scheme (see Appendix II), the satisfaction of all four of the higher needs depend if they are to contribute to our overall satisfaction, S—and people, wisely, are rather wary of tinkering with the arrangements that provide it.

True addictions not only compel us to repeating the act of consuming them by delivering pain when we do not, but the amount of pleasure they provide each time wanes. We "build up tolerance," or resistance, to the effect of the good. This induces addicts to consume ever larger and more frequent doses, the lack of which precipitates even greater pain.

This is not the place for a long disquisition on the evils of addictive goods. Strongly addictive goods are rarely legal, so crippling can they become; but suffice it to say that many legitimate goods, such as legal advice, psychiatric services, and higher education borrow some of the mechanisms of addiction to maintain their high value. To engage them in any way is to discover how much more of the same is needed. So, for that matter, do many personal relationships involve one party cultivating an addiction (to themselves) in the other. Indeed, not only tobacco companies want us "hooked:" ultimately, everyone would like us dependent on what they alone supply.

These are easy observations, however, easy hits, and I should like to offer something more substantive about the unique challenges to economic theory posed by addictive goods along the lines that Scitovsky lays out. We will find that Scitovsky's persistent appeal for more stimulating pleasure(s) may not be without dangers of its own.

Few goods give us lasting satisfaction; and those that do ("gifts that keep giving"), when scrutinized, will be seen to deliver their utility in small doses, little waves of satisfaction, more or less closely spaced together as we engage them again and again: touching them, eating them, thinking about them, casting our eyes upon them, making withdrawals, and so forth. Let us look at a single such "wavelet of satisfaction" and give it a plausible, prototypical form.

The wave would begin in anticipation, slope up, reach some plateau, and then begin to ebb or dissipate. Figure 8 illustrates what this might look like, and plots also the first derivative of satisfaction (read "comfort," or "utility") with respect to time, which, as we have determined—and as Scitovsky also proposes, pace Spinoza—would be a measure of pleasure, of rate-of-change of satisfaction.

(Place Figure 8 about here)

Now, what is the effect of successive wave(let)s of satisfaction such as we feel with bites of chocolate or glances at our loved ones? Assuming for simplicity's sake that they are regularly spaced in time, Figure 9 shows how these individual waves, superposed, would sum in total satisfaction and accumulate. With the prototypical wave form we have posited, notice what emerges. It's a classic Weber-Fechner "utility" curve. A little bumpy at first, but there you are. Like a single note struck successively on a series of pianos with their sustain pedals down or struck on a series of bells, the total sound level curves up to a finite and *level* loudness.

(Place Figure 9 about here)

Many interesting thought experiments can be made using this model. For example, we could change the wavelet-form in peak and shape, either individually or as a group; we could adjust its periodicity, gradually or slowly, to see what happens to the cumulative wave, and so forth. Each adjustment would likely have a real-life correlative, some recognizable story of satisfactions come and gone...but we cannot explore and spell them out here. Instead, let us look at Figure 10, which portrays what happens to the successive wavelets of pleasure (defined, we recall, as the time rate of change of satisfaction) associated with our prototypical satisfaction waves. The cumulative picture changes entirely.

(Place Figure 10 about here)

To wit: after only a few iterations, as the longer, negative "tails" of the pleasure wavelets begin to overwhelm the shorter positive crests, cumulative pleasure becomes negative and stays there. There are only two ways back up into the positive zone: (1) rapidly decrease the interval of time to the next wavelet, i.e., increase its frequency, or (2) markedly increase the height (peak value, strength) of the next satisfaction wavelet. If we substitute "dose" for "wavelet," are these not the behaviors we see in addicts?

I would suggest that we have here the core of a "psychoeconomic" model of addiction. For as I indicated earlier, I think it highly plausible that the brain constantly differentiates in the mathematical sense, i.e. measures the degree and the rates-of-change of neural impulses, their voltages and frequencies. We know that this is true of retinal, inner ear, and haptic neurons, and it seems reasonable that this "skill" would be common at all levels and scales of mental processing. So too would be the ability to integrate or "sum up" these changes, yielding cumulative absolute "readings" for the purpose of assessing, comparing, and meeting thresholds.

Now imagine that our "well-being judgment centers" had a choice of whether to pay attention to *pleasure* levels or *satisfaction* levels, that is, to first (and higher-order) time-derivative data or to time-integrated absolute data, before reporting to us, as it were, whether we were happy or not. If, through some such choice, we were to

register satisfaction itself, or at least give valuational priority to it, then our feelings of well-being would proceed as Figure 9 illustrates. If, however, given the same incoming stimuli, we were to register pleasure instead, or give valuational priority to pleasure, *then our feelings of well-being would cascade downward as Figure 10 illustrates...like an addict's*. And like an addict, our only solution would be to wait out the pain, go "cold turkey," or intensify the incoming stimulus (which of course only postpones the problem of pain).

Imagine, in other words, that there are three centers of assessment—I make no anatomical assignments here—the first measuring integrated state-of-satisfaction data, the second registering time-derivative change-of-state, i.e. pleasure, data, sending their information to a third center that combines them in order to make a judgement of current well-being. Is it possible that there are certain substances which, when consumed, neuro-chemically paralyze the first center and/or stimulate the second center? These substances would ipso facto be highly addictive. Or perhaps they disable the third center of assessment, making it deaf to satisfaction and comfort data from the first and registering only the second. The effect would be the same.

We have all heard of "addictive personalities." Is it possible that these are people who by predisposition either have hypo-active satisfaction centers, hyperactive pleasure centers, or pleasure-biased judgment centers? The difference between how an alcoholic and a "big drinker" handles his or her alcohol may well lie here.

Now let us look at our commerce-driven culture. Producers have an interest in consumers who pay more attention to evanescent, addictive pleasures than to cumulative, if not ever-lasting, satisfactions. A few hours watching television surely conveys the message that endless joy is possible, pleasure higher, higher, never to descend, that ecstasy is at hand. Compared to such images, your daily life and mine are like prisons. Counteracting this message involves the difficult task of championing certain dormant cultural values, values that discount pleasure in favor of satisfaction, i.e. values that discount the rush, the thrill, the lift, the stimulation, the titillation, the sensation-alism of what the market claims will make us happier the faster, in favor of pursuits that require appreciation, stocktaking, admiration, understanding, savoring, judging, and the like, whatever the need addressed. Any number of spiritual traditions advise the same.

But woe to us if they dominate instead. For the best system is surely one that balances the two: a middle way of a more complex-and-organized sort, one that delivers us pleasure and satisfaction both, joy and comfort.

The Joyous Habitat?

I return to question of architecture and the environment, which is more my concern than Scitovsky's. If our economy were less "joyless" would we have more exciting

architecture? I imagine so: contented heads build boring buildings. But it is not exciting buildings I am after—Disney can take care of that—but fine ones, subtle ones, comfortable ones, and, yes, more expensive ones.

According to Gresham's Law, bad money drives out good money. What this means, more technically, is that when two coinages of different metals but with the same face value circulate, then, over time, the coin that is cheaper to manufacture (the "bad" money) will come to dominate, and those of the more expensive metal (the "good" money) will become hard to find. The good money will have been returned to the mint for greater amounts of the new coinage, or will have been hoarded for its metallic value. As time went by and as accounting systems become more elaborate, the value of a coin came to have less and less to do with its material composition and more to do with "seignorage," the authority of the coin's all-but-nonmaterial imprint and the universal acceptance of that authority. Paper money soon followed, then digital. The essence of money is its acceptability in trade, and any physical or other property of currency that costs time or materials to produce and that does not furnish this essential trait—by definition extraneous—is progressively stripped away.

Something like Gresham's Law is at work in many sectors of our economy. For the same logic of efficiency applies to any marketplace good manufactured under competitive conditions. Any good that by virtue of its design, materials, or history has more properties or qualities than are valued by the consumer will tend to "evolve" into a more targeted, function-fitting form. Why spend money on extraneous qualities? asks the producer. Why spend money on extraneous qualities? agrees the consumer, who may not even notice what is missing. Goods have "selling points," and these are to be isolated and highlighted at every stage.

Once this logic takes hold, the tendency towards simplification, towards reduction, may be rationalized by appeals to the "beauty of spareness," to the "elegance of essentials," and so on. But what draws once complex and nuanced and appreciated products into the funnel of Gresham are the handsome profits to be made—for a while, at least—as previous consumer expenditure-expectations lag behind the falling real cost of the streamlined substitute. The early days of modern architecture were glory days for this reason. Through computerization, education is about to take the same plunge. For when the rate of cost-saving technological innovation slows and the marginal cost of producing of a good can no longer drop faster than expectations of price reductions and/or the loss, with abundance, of the good's value to consumers, the market soon catches up. Competing producers begin to work at the very edge of profitability, cutting corners, and putting the burden of co-production on the consumer: let him fill in the blanks, find the parts, smooth the rough edges, pretend nothing has changed, or learn to like "lean." Will he not be freer?

For architects today, at any rate, there is very little room to move. (Education will soon find itself painted into the same corner.) The technological innovations of

modernism—steel, concrete, glass, height, elevators, air conditioning, prefabrication—have all been exploited. Buildings are about as lean as they can get. There is no going back, even though those fine old buildings that we so admire were no more expensive to build in their day than they would be to build again, identically, today, relative to the adjusted general price level. No, the will is no longer there for "frills," for generosity, civic expression, and the like, or if not the will, then ways to promulgate the highest ideals of what is worth doing for ourselves and for our children vis a vis the built environment (and as against other ambitions such as making money, living forever, or being thoroughly entertained, now). The American economy in recent times may or may not be joyless, as Scitovsky claims, but the American people are obsessed with freedom, and have been so for two hundred years. It is our highest value, our topmost need—which is admirable. But in taking every shortcut we can think of to get there the sooner, our obsession with freedom has propelled us towards valuing ever greater personal mobility and financial liquidity, and fewer attachments and commitments to family, firm, or place. We have no patience for "trappings," for what lasts, what closes options, speaks softly, or means too deeply. We have no time for architecture.

Can anything be done about this, on behalf of architecture, on behalf of ordinary Americans who themselves are bewildered and unhappy about where their values are visibly leading them? Can these trends be bucked, mitigated, or here and there be harnessed? I believe they can; but this is the subject of another paper.

In going back to the beginnings of value theory, Scitovsky has taken us in the right direction. I hope that I have indicated where some of us might go from there, and what there is yet to find. •

APPENDIX I

Is there a single number or measure of complexity-and-organization that captures this dynamic? Indeed there is. In my own work I have proposed to call it, portentously enough, Ω , omega, which I define mathematically as the geometric mean of actual complexity, C_{act} , and organization, $R (= C_{pot}-C_{act})$, where C_{pot} is "potential complexity" or entropy = $\log N$, where N is the number of alternative possible states of the system. That is, $\Omega = [C_{act}R]^{0.5}$. Note that if $C_{act} = C_{pot}$, then $R = 0$ and $\Omega = 0$, and if $C_{act} = 0$, then $\Omega = 0$ too. (By definition, $C_{pot} \geq C_{act} \geq 0$, so that $R \geq 0$ and $\Omega \geq 0$ always).

(Place Figure 11a, b, and c about here)

All this can be transcribed as shown in Figure 11(a) and 11(b). Figure 11(c) is a three-dimensional view of the half-(quasi-)conical surface of Ω . The shaded vectors in 11(a) and 11(b) indicate directions of increase-of- Ω and therefore positively valued events for the relevant system. The locus of points having this maximum Ω for a constant C_{pot} lie along the ridge of the cone. This ratio is, of course, something of an artifact of the model in its unparameterized simplicity. One would not expect it to have empirical validity. Nevertheless, it turns out to agree closely with the parameter lamda, λ , discovered empirically by Christopher Langton. λ is the normalized ratio of possible to impossible states that a given cell in a cellular automaton can switch to. When $\lambda \approx 0.5$ for each cell, the ensemble of cells crosses over into life-like behavior, that is, to behavior that is neither chaotic nor stationary, but complex-and-organized: predictable in character but not predictable in detail.

The reader may wish to compare Figure 11(b) to Figure 4. For any given magnitude of C_{pot} , a "Wundt-like" curve is generated with complexity-and-organization—lifeliness—at a peak in the center. From this optimum point, value is to be had only by increasing C_{pot} , which, we remember equals $\log N$, where N is the number of possibilities for choice and/or action open to the person (or "system"). C_{pot} is thus, in a sense, a measure of potential freedom, or perhaps of freedom itself if one wants to think of freedom as intrinsically a potentiality. C_{act} then becomes a measure of the amount of freedom adopted or actualized. In any event, for us, the "ceiling" of freedom is raised primarily in two ways: first, by acts of imagination, second, by acts of observation or discovery. The first increases the size of the world, as it were, by introducing thoughts and combinations of thoughts, sights and combinations of sights, sounds and combinations of sounds, that had not been experienced before. New goods, new things to do. The second comes from paying closer attention to the character of already existing things, and making finer discriminations in them and between them. Where two goods, A and B, were identical before, now they appear as different; with more to consider now, we have the process of refinement, we have micro-complexity.

In Figure 11(c), we see how, in order to continue to "flow" up the ridge of the Ω -surface from the "comfort crest" of any one C_{pot} contour, one must adopt and act upon approximately the square root of the number of options or discriminations one is capable of imagining or making. From any other starting position on the Ω -surface, the vector of most value coincides with the steepest direction upward given the local slope of the surface.

APPENDIX II

The temptation is enormous simply to map the six needs onto six Wundt-like C_{pot} contours as in Figure 11(b), and talk about a sort of zigzagging up the ridge of Ω . But this would be too great a simplification. The most parsimonious expression of total satisfaction (or utility, or well-being), \mathbf{S} , that has the properties discussed looks like this:

$$\mathbf{S} = S_1(1 + S_2(1 + S_3(1 + S_4(1 + S_5(1 + S_6))))))$$

where $0 \leq S_j \leq 1$ is the current degree of satisfaction of the j th need, $j = 1, 2 \dots 6$. Notice how the lower needs have "veto power" over the higher. The value of any good or activity is given by the change it occasions, not in S_j as such, but in \mathbf{S} over some time period Δt . That is to say, value, $V = \Delta \mathbf{S}$. I use \mathbf{S} because there are very few goods or activities which satisfy only one need at a time. Indeed, most goods, and especially economic goods, which entail payment of some sort, affect some needs in a positive direction and others in a negative direction, and how it all turns out depends on the degree of satisfaction of each affected need at the time. For imagine that the satisfaction of each need, taken separately, obeys the law of diminishing marginal utility. Then a loss to a well-satisfied lower need might be matched by a substantial gain to a very-little-satisfied higher need, thus reversing temporarily the inbuilt bias towards weightier dealings in the lower need. The greyed "vectors of value" depicted in Figures 11(a) and (b) refer to V when unlabeled, but, more fully analyzed, each such V -vector could be replaced by a family of six component vectors located in different places on the Ω -surface and pointing in different directions. (Note that whereas $\mathbf{S} \geq 0$, V can be positive or negative, as can V_j .) Satisfaction—well-being—lies in complexity-and-organization embodied, in lifefulness felt. Value—"well-becoming"—lies in complexity-and-organization changed, in lifefulness increased.

In JE and elsewhere, Scitovsky makes much of the fact that the brain has separate but interacting centers for pleasure and pain, leading him to conclude that: "the absence of pain is no precondition for feeling pleasure and...a lot of pleasure is compatible with a lot of pain" (62). This surely oversimplifies the case of course, as do I, but, more importantly, Scitovsky does not really require the neuroanatomical information he presents in order to show that one can feel discomfort and pleasure at the same time. The brain is surely, in every part, a capable differentiator and integrator of trains of nerve impulses. So let us agree to what does not require

neurological validation (though it might be interesting to trace where in the brain this all happens): that the good often comes with the bad, that we are fully capable of comparing the positive value of the good with the negative value of the bad and arriving at an assessment of the net value of accepting both. We are also fully capable of keeping this net value in mind at the same time that we keep the nature and extent of the good and the bad in mind, and for long periods of time at that. At the same time we can be perfectly aware of the price we are paying, in itself a displeasure or pain, and wish it were less. Is this sort of accounting not a daily occurrence? Work, for example, is a loss of freedom continuously and voluntarily suffered for the sake of gains in one or more of the other needs as well as for the freedom returned in the form of a salary or wage, i.e., money to do with what one will after one has done, with some portion of it, what one must.

Bibliography:

Albanese Paul J., Ed. 1988. *Psychological Foundations of Economic Behavior*. New York: Praeger. 35-57.

Becker, Gary S. 1996. *Accounting for Tastes*. Cambridge: Harvard University Press.

Benedikt, Michael. 1997. "Psychological Economics: An Outline." *Center 10*. Austin: University of Texas Press.

Braybrooke, David. 1987. *Meeting Needs*. New Jersey: Princeton University Press.

Brooks, Daniel R. and E. O. Wiley. 1988. *Evolution as Entropy, Second Edition*. Chicago: University of Chicago Press.

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

Csikszentmihalyi, Mihaly. 1991[1990]. *Flow: The Psychology of Optimal Experience*. New York: HarperCollins.

Ekins , Paul, M. Hillman, R. Hutchison. 1992. *Wealth Beyond Measure*. London: Gaia Books. 37

Festinger, Leon, V. Allen, and others. 1964. *Conflict, Decision, and Dissonance*. Stanford, Calif.: Stanford University Press..

Festinger, Leon. [1957] 1962. *A Theory of Cognitive Dissonance*. Stanford, Calif.: Stanford University Press.

Galbraith, John Kenneth. 1992. *The Culture of Contentment*. Boston: Houghton Mifflin Co.

Gossen, Hermann Heinrich. [1854] 1983. *The Laws of Human Relations and the Rules of Human Relations Derived Therefrom*. Translated by Rudolph C Blitz. Cambridge: MIT Press. lxxiv ff.

Herring, Hubert B. "Mind over Muscle," *New York Times*, November 19, 1995, E2.

Kane, Robert, 1994. *Through the Moral Maze* New York: Paragon House. 51 ff.

Langton C. G., C Taylor, J.D. Farmer, S. Rasmussen, eds. 1992. *Artificial Life II*. New York: Addison Wesley. 44.

Martindale, Moore, and Borkum. 1990. "Aesthetic Preference: Anomalous findings for Berlyne's psychobiological theory." *American Journal of Psychology* 103(1): 53–80

Maslow, Abraham. [1954] 1970. *Motivation and Personality*. New York: Harper and Row.

Max-Neef, Manfred, et. al. *Human Scale Development: an Option for the Future*. Cited in Ekins (1992)

Mirowski, Philip. 1989. *More Heat Than Light*. New York : Cambridge University Press

Newell, Alan, and Herbert Simon. 1972. *Human Problem Solving*. Englewood Cliffs, NJ: Prentice Hall.

Scitovsky, Tibor. 1986. *Human Desire and Economic Satisfaction*. Sussex: Wheatsheaf Books. 97—113.

Spinoza, Baruch de. 1934. *Philosophy of Benedict de Spinoza*. Trans. R. H. M. Ewles. New York: Tudor Publishing Co. 176.

Thaler, Richard H. 1992. *The Winner's Curse*. New York: Macmillan, The Free Press. pp. 139-150

Wachtel, Paul. 1983. *The Poverty of Affluence*. New York: The Free Press.

Weber, B. H., D. Depew, and J. D. Smith, Eds. 1988. *Entropy, Information, and Evolution*. Cambridge: MIT Press.