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I

THE APPROACHING SUMMIT

The summit of our civilization is just ahead, so we all need to consider how our lives will change and the plans we should make accordingly. Part I considers the present condition, controversies about the future, and the general idea that a natural turndown and descent can be *prosperous*. After Chapter 1 introduces the book, Chapter 2 shows our present condition with recent data, and Chapter 3 reviews the widely different writings of other authors about the future.

Perhaps then readers will be ready for the chapters on systems principles in Part II to explain what is happening. In Part III we use those principles to recommend policies.

1

INTRODUCTION TO THE WAY DOWN

Like a giant train, the world economy is slowly cresting its trip up the mountain of growth. It may be ready soon for its long trip down to a more sustainable lower level. The developed nations that were leading on the way up are poised for leading again, but this time down. In Chapter 1 we explain the concept of *A Prosperous Way Down*, pointing to the later chapters on our present condition, the views of others, the principles by which the global system is understood, and the policies required for society to adapt. We also explain why we need to think with systems diagrams, the analogies with ecosystems, our summary of public skepticism, and the flip in attitude that is likely. Recall the story for children about the little train going up the mountain (Figure 1.1): “I think I can; I think I can.” Then coming down: “I thought I could; I thought I could.”

THE PROSPEROUS WAY DOWN

Precedents from ecological systems suggest that the global society can turn down and descend prosperously, reducing assets, population, and unessential baggage while staying in balance with its environmental life-support system. By retaining the information that is most important, a leaner society can reorganize itself and continue making progress. The situation is analogous to the human brain, which regularly dumps less essential information in short-term memory while gathering what is important for the long-term memory.

The reason for descent is that the available resources on Earth are decreasing. Each year more effort is needed to provide the fuels, water, wood, fish, soil, food, electric power, and minerals on which everything else is based. More and more of the economy goes into concentrating what remains with less left for the private lives of people. More

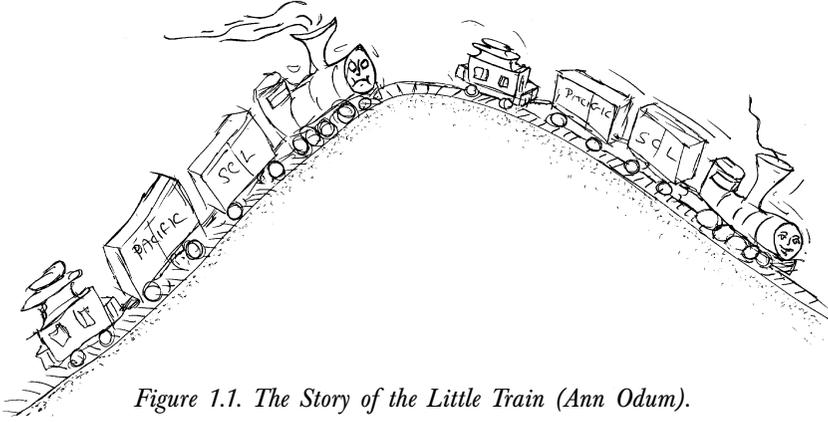


Figure 1.1. The Story of the Little Train (Ann Odum).

and more of the resources supporting the developed nations are diverted from people in other countries by the global economy. The present levels of our urban civilization cannot be sustained indefinitely on the worldwide declining concentrations of resources (see Chapter 10).

Make no mistake, this is *not* a proposal for less growth. It is recognition that general systems principles of energy, matter, and information are operating to force society into a different stage in a long-range cycle. One set of policies is needed for the transition and another set for the descent. We can also look way ahead at a lower energy period when environmental resources accumulate again.

In spite of tendencies toward economic competition, global cooperation has increased. Global unity was improved by teaching ideals of mutual respect and equitable trade. Resurgence of local characteristics, customs, and environmental adaptation has also occurred, helping people to find a smaller group identity in a large complex world. Strengthening local culture is desirable, provided it is accompanied by mutual respect and shared belief in cooperative working relationships among those who are different. The global significance of the 1999 Kosovo war in Yugoslavia was to establish the principle that military aggression against people who are different is no longer acceptable to the majority of nations.

That the way down can be prosperous is the exciting viewpoint whose time has come. Descent is a new frontier to approach with zeal. The goal is to keep the economy adapted to its global biophysical basis. We have to abandon some of our useless diversions. If everyone understands the necessity of the whole society adapting to less, then society can pull together with a common mission to select what is

essential. Presidents, governors, and local leaders can explain the problem and lead society in a shared mission. Millions of people the world over, if they see the opportunity, can be united in the common quest for a prosperous way down. The alternative is a world of selfish battles for whatever resources remain.

UNIQUE BASES FOR EXPLANATIONS

This book is different because its explanations about society come from the general scientific concepts that apply to *any* system. These concepts suggest the constraints on the future to which human society will have to fit. In the language of general science, the system of human society and its environment is self-organizing. Through the initiatives of millions of people all sorts of things are tried daily. Those that work are copied by others and become part of the mainstream system of society.

The processes of nature also self-organize with restless testing. The most familiar example is natural selection among species, but reinforcement of what works also occurs in other kinds of systems and on different scales. Thus the global pattern of humanity and nature is a combination of the stormy atmosphere, swirling ocean, slowly cycling Earth, life cycles of living organisms, ecological adaptations, and the complex actions of human society and its economics.

Theory and research now suggest that many, if not all, of the systems of the planet (and the universe) have common properties, organize in similar ways, have similar oscillations over time, have similar patterns spatially, and operate within universal energy laws. If so, it is possible to use these principles in advance to select policies that will succeed. In other words, humans can use their intelligence and social institutions to avoid some of the wasteful mistakes caused by trial and error, doing a better job at evolving a prosperous world within the constraints of nature.

Unfortunately, we have no procedures for proving that principles are general except to keep testing them in new situations. When a principle is successful in explaining outcomes for many examples, it begins to be more and more trustworthy. The general principles offered in Part II have been applied widely, and evidence has come from many different disciplines. Hopefully readers will recognize examples from their own experiences.

Views and Scales

In Chapter 3 we review the wide range of ideas of other authors about our society. Many of their views are consistent with principles in Part II. What we offer is a way to tell which of the myriad of scenarios from futuristic imaginations are appropriate and likely for the times ahead.

Some of the authors try to find causes in short-term, small-scale processes and mechanisms such as: interactions of economic markets, cultural reactions, global capitalism, national policies, atmospheric changes, religious movements, local wars, technological innovations, and so forth. But the general systems view is that the larger-scale pattern selects what is workable from the trials and errors of the smaller scale. The regime prevails because it maximizes the performance possible for those conditions.

Often implied is that humans can select whatever destiny is desirable—a half-truth. The new hope of our time is that the designs in society that will ultimately prevail can be found more rationally by using large-scale principles more, wasteful trial and error less. The new global sharing of information and ideas makes it possible for billions to learn about world pulsing, and to embrace a new faith that coming down is OK.

In this book we recognize the way the important controls on any phenomena come from the next larger scale, determining the main cycles of growth, turndown, catastrophes, and regimes of energy and material to which society must fit. This is a type of scientific determinism. The paradox is that most scientists restrict their deterministic beliefs to the realms of their specialties. When it comes to society and politics, many share the public's view and deny that large-scale principles control phenomena.

Emergy Evaluations

Many futurists write of processes and change qualitatively, although economic data are sometimes cited. In this book we use a new measure—*emergy*—to evaluate the main inputs, products, and accomplishments of our world on a common basis. It is a special measure of the previous work done to make something, whether the work was done by natural processes or by humans.¹ For example, emergy values of exchanges explain why well-meaning international investments and loans have been crushing underdeveloped countries.

Ecosystem Analogy

Forests, lakes, grasslands, coral reefs, sea bottoms, and so forth are ecological systems (ecosystems). They operate on a smaller, faster scale than civilizations, and humans can more easily see the essence of their complexity in relation to the controlling principles of energy, materials, and information. Like civilizations, they have growth cycles, periods of weed-like growth, and periods of high complexity and diversity analogous to human pluralistic societies. Ecologists have a range of views. Those at one extreme see many random processes and seething interactions of species struggling for existence. Those with our view see a high degree of self-organization involving causal interactions

through intermittent pathways best generalized with energy systems principles.

Important for our purpose in this book, many ecosystems grow and decline in cycles that are repeating and sustainable. For example, lake ecosystems have daily and seasonal cycles. Forests have cycles involving many years each. H. K. Okruszko² named the stage of peatland decrease as *decession*, the opposite of *succession*, the development stage. The normal cycle of some ecosystems includes sharp “destructive events” like fire or consumer epidemics, which are beneficial in the long run, because they accelerate downsizing to the next stage. Dynamiting old buildings for urban renewal is analogous to the ecosystems’ destructive events. Thus we use ecosystem comparisons for insight into the larger-scale cycles of our own society.

Network Diagrams for Understanding

Although the call for a systems view is widespread, most people discuss the problems and solutions with verbal concepts that don’t give the mind an understanding of connections. Often people won’t take the time to study network diagrams that are necessary to visualize causes. The late economist Kenneth Boulding, a brilliant writer, reviewed our earlier book *Energy Basis for Man and Nature* and wrote that it was not necessary to look at the diagrams. But understanding systems requires a language that shows how the connections work. For an overview of the complex system of humanity and environment, the human mind needs the comprehension that comes from seeing the connected functions of the network simultaneously in the mind’s eye.

For human understanding the network first needs to be simplified by aggregating the complexity into the main process and parts that are important. Getting the system view in mind helps in understanding the way structure is related to function. You can see parts, wholes, and consequences at the same time, carrying a systems image in memory.³ Since basic mini-model configurations apply to different kinds of systems on all scales, a person accumulates ways of transferring understanding to new situations.

Policy from Mini-models

Many—if not most—people trained in science learn about separate parts and relationships, expecting computers to synthesize what the combinations will do. But carrying a simple mini-model of a system in mind is a different methodology from expecting computer simulation of large complex models to generate something of which the mind understands only a part at a time. Policy about complex systems is usually made with whatever synthesis word-models provide. Better policies can result if simple mini-model diagrams are kept at hand to visualize causes.

Scale of View

The human mind is like the zoom microscope, able to change focus rapidly from small scale to large scale. For example, some writers describing the behavior of society as a whole use concepts and language from the smaller scale of human psychology about the behavior of individuals. Sometimes authors use analogies to clarify a point. The authors may mean that the society is the sum of the individual psychological actions. Or the writers may mean that individuals and the society are both examples of the same general systems model. Because words are so all-encompassing with so many alternate meanings, they are not very rigorous for representing systems relationships and many scales.

In Part II of this book we use network mini-models to make points about transition and turndown. Our explanations of how the Earth's economic system works can be best understood by putting the pictorial images of systems relationships in mind.

CONTEMPORARY CHANGE

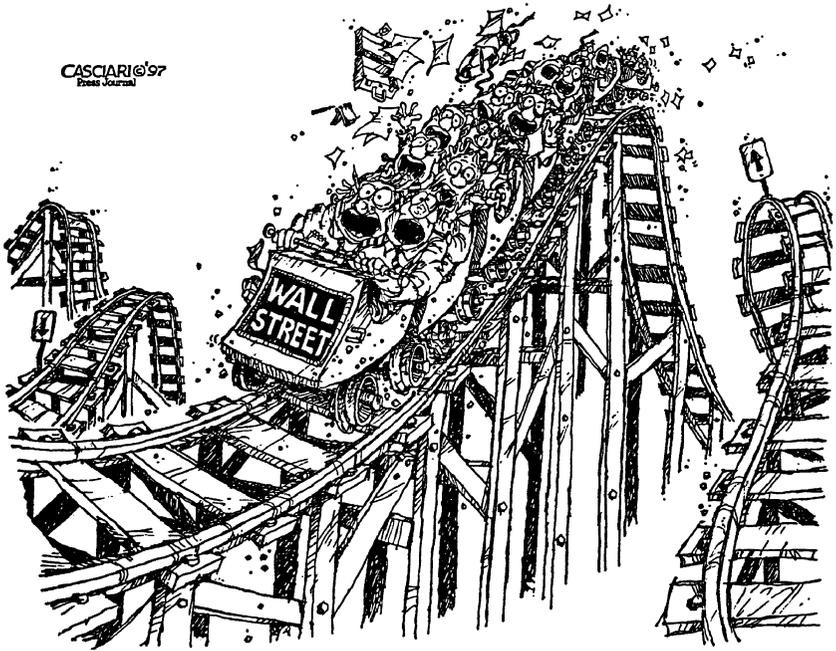
The summit for the global economy ahead is hidden by the surge of affluence in the wealthy sectors of a few countries. But downsizing is already occurring in many parts of the system. This is the start of the long process of reorganizing to form a lesser economy on renewable resources. If we do not understand the principles that are causing the decreases, we won't plan the needed changes. Without a collective mission to adapt, we are more likely to stumble with delay, failures, fear, desperation, conflict, malaise, pestilence, environmental destruction, and collapse.

The Present Reality

Whether the crest in the United States has been reached yet is not clear because short-term fluctuations of the economy mask long-range trends. The annual increases in gross economic product show money circulating more rapidly. Much of it, however, is through finance and stock markets, and circulates without producing real wealth. There are surges in computers and communication but pathological waste of resources in, for example, excess cars. Other measures show important parts of the economy and Earth systems in decline. Recent books on the future and its policies are wildly different. Some warn of crash and others of perpetual boom ahead.

Trends

In Chapter 2, recent trends in resources, population, information, human welfare, and economic states are quoted from various authors and sources. In Chapter 3 (especially pp. 50–53) many of the authors cited look to the future by extending the trend lines on these indices



Cascari © 1997, courtesy Vero Beach Press Journal.

of society, usually with properties growing upward. Yet all who know about the causal connections between energy, materials, and growth expect an eventual turndown. The question is when. What is argued is: how many usable fuel and mineral resources are still to be discovered underground? And how much of the present world economy could be supported on the proposed alternative energy sources, most of which have been under intensive research for a half century? Whether turndown is near or to follow later, task forces are needed at local, national, and international levels to plan for transition.

Instead of planning for descent, many writers, journalists, and political leaders encourage a continuation of the established public mind-set on growth that was okay for the time of expanding resource use. For some it is failings in their education; for others it is overfocus on the short range. Nearly six billion people are in denial, and for leaders to speak of a nongrowth period is viewed as political suicide. But the paradigm of growth is a shared global attitude that may switch all at once for all together when the truth becomes obvious through some galvanizing event. Or perspectives may shift gradually as books like this one circulate.

PUBLIC PERCEPTION

Interruptions in fuel supply in the 1970s gave people a momentary glimpse of a resource-limited future. As we cite in Chapter 3, many authors considered how to adapt to lower energy availability. But decreasing before you need to is contrary to fundamental energy principles, as we will explain. In the 1980s the world could be and was still engaged in growth. Plans for descent seemed nutty. When the first draft of this book was written in 1982, “coming down” was considered only by a few as a pleasant, alternative lifestyle to seek as a matter of choice. Publishers did not think their readers would be interested. By the end of the century some decreases began. Some downsizing was erratic, divisive, and competitive, a bitter contrast to the ideal of a prosperous descent.

Not enough people understand the large-scale changes requiring them to change individually. Few have been trained to think about resource limits on the large scale. Few people now believe that principles other than that of the free market controls the overall economy. In the late 1990s the real wealth per person was oscillating even though leaders were still talking about more growth. Inequity, blame, and class consciousness threatened the fabric of society. Many returned to the ways of the nineteenth century, when there was more selfish individualism and competition. Although political pressure to downsize has been directed at government, more—not less—government coordination may be needed to adapt society to the new stages ahead.

Some of the indices of our society (see Chapter 2) had stopped growing by 2001. Perhaps going into the twenty-first century people are more open to explanations of the root causes for change. Many are not happy, blaming others or fostering greed in the economic system. They may be ready for the concepts and policies given here that can make the inevitable descent better.

One New York publisher explained why a trade book on future policies based on energetics and systems principles probably would not sell. He said “people don’t believe scientists have any special insight on the future.” They don’t believe humans, economy, and environment follow collective scientific principles. Especially where people are raised with an emphasis on human freedom and choices, the public does not feel controlled. Many have faith in free market economics, because explosive capitalism fits the stage of weedy growth that has lasted for two centuries.

An important quality of our social species is the ability to reprogram ideals and objectives when it becomes apparent to the majority that it is necessary. When growth is possible, then it is necessary, and everything that goes with the exploitation and competition of expan-

sion stages is regarded as good. Then when adapting to descent is necessary, everything that goes with making that stage efficient becomes good. We even slant history with ideals of the present. People already write about the fanatic, zealous, and sometimes ruthless exploitation used for expansion in the nineteenth century as evil, but it was not the public view then. Exploiters were heroes. It is fascinating that changes in attitudes appropriate for a time of leveling and transition, such as complexity, cooperation, diversity, and environmental adaptation, are already being recognized as new ideals.

According to one principle, systems help maximize their performance by the accumulation of stores of materials, energy, or information, to be followed later by a sharp pulse of growth by a using consumer. This mechanism of change applies to public opinion too. Need for a change and consciousness of it accumulate bit by bit in more and more people until a threshold is reached when the whole group discusses and switches attitude, using the energy from the unified focus to change institutions. Perhaps we are now in the stage of accumulating new attitudes for turndown and descent.⁴

Many books try to enlist people in social movements with the assumption that change depends on human choice. But it may be vice versa, that social change is set by events in the resource-civilization cycle. If readers will stay with us long enough to consider the principles (see Chapters 4–8), they may be open to the predictions and policies that might otherwise seem radical.