Uneconomic Growth in a Full World

by Herman E. Daly

That which seems to be wealth may in verity be only the gilded index of far-reaching ruin…
– John Ruskin
Unto this Last, 1862

Growth in GNP is so favored by economists that they call it "economic" growth, thus ruling out by terminological baptism the very possibility of "uneconomic" growth in GNP. But can growth in GNP in fact be uneconomic? Before answering this macroeconomic question let us consider the analogous question in microeconomics – can growth in a microeconomic activity (firm production or household consumption) be uneconomic? Of course it can. Indeed, all of microeconomics is simply a variation on the theme of seeking the optimal scale or extent of each micro activity – the point where increasing marginal cost equals declining marginal benefit, and beyond which further growth in the activity would be uneconomic because it would increase costs more than benefits. Quite aptly, the MB = MC condition is sometimes called the "when to stop rule."

But when we move to macroeconomics we no longer hear anything about optimal scale, nor about marginal costs and benefits, nor is there anything like a "when to stop rule." Instead of separate accounts of costs and benefits compared at the margin we have just one account, GNP, that conflates cost and benefits into the single category of "economic activity." The faith is that activity overwhelmingly reflects benefits. There is no macroeconomic analog of costs of activity to balance against and hold in check the growth of "activity," identified with benefits, and measured by GNP. Unique among economic magnitudes, GNP is supposed to grow forever.[2] But of course there really are costs incurred by GNP growth, even if not usually measured. There are costs of depletion, pollution, disruption of ecological life-support services, sacrifice of leisure time, disutility of some kinds of labor, destruction of community in the interests of capital mobility, takeover of habitat of other species, and running down a critical part of the inheritance of future generations. We not only fail to measure these costs, but frequently we implicitly count them as benefits, as when we include the costs of cleaning up pollution as a part of GNP, and when we fail to deduct for depreciation of renewable natural capital (productive capacity), and liquidation of nonrenewable natural capital (inventories).

There is no *a priori* reason why at the margin the costs of growth in GNP could not be greater than the benefits. In fact economic theory would lead us to expect that to eventually happen. The law of diminishing marginal utility of income tells us that we satisfy our most pressing wants first, and that each additional unit of income is dedicated to the satisfaction of a less pressing want. So the marginal benefit of growth declines. Similarly, the law of increasing marginal costs tells us that we first make use of the most productive and accessible factors of production – the most fertile land, the most concentrated and available mineral deposits, the best workers – and only use the less productive factors as growth makes it necessary. Consequently, marginal costs increase with growth. When rising marginal costs equal falling marginal benefits then we are at the optimal level of GNP, and further growth would be uneconomic – would increase costs more than it increased benefits.

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Why is this simple extension of the basic logic of microeconomics treated as inconceivable in the domain of macroeconomics?[3] Mainly because microeconomics deals with the part, and expansion of a part is limited by the opportunity cost inflicted on the rest of the whole by the growth of the part under study. Macroeconomics deals with the whole, and the growth of the whole does not inflict an opportunity cost, because there is no "rest of the whole" to suffer the cost. Ecological economists have pointed out that the macroceconomy is not the relevant whole, but is itself a subsystem, a part of the ecosystem, the larger economy of nature.

These ideas are represented in Figures I and II. Figure I shows the preanalytic vision of ecological economics – the economy as subsystem of a larger ecosystem that is finite, nongrowing, and materially closed. The ecosystem is open with respect to a flow of solar energy, but that flow is itself finite and nongrowing. There is an "empty-world" and a "full-world" version of this basic vision, reflecting the fact that people who share the same paradigm can have differing senses of urgency based on different interpretations of "the facts." Both will agree, however, that the goal is an optimal scale of the economy relative to the ecosystem. The optimal scale is that for which welfare is greatest.

We have two general sources of welfare: services of manmade capital and services of natural capital, as represented by the thick lines in Figure I. As the economy grows natural capital is transformed into manmade capital. More manmade capital results in a greater flow of services from that source. Reduced natural capital results in a smaller flow of services from that source. Moreover, as growth of the economy continues, the services from the economy grow at a decreasing rate. As rational beings we satisfy our most pressing wants first – hence the law of diminishing marginal utility. As the economy encroaches more and more on the ecosystem we must give up some ecosystem services. As rational beings we presumably will sequence our encroachments so that we sacrifice the least important ecosystem services first. This is the best case, the goal. In actuality we fall short of it because we do not understand very well how the ecosystem works, and have only recently begun to think of it as scarce. But the consequence of such rational

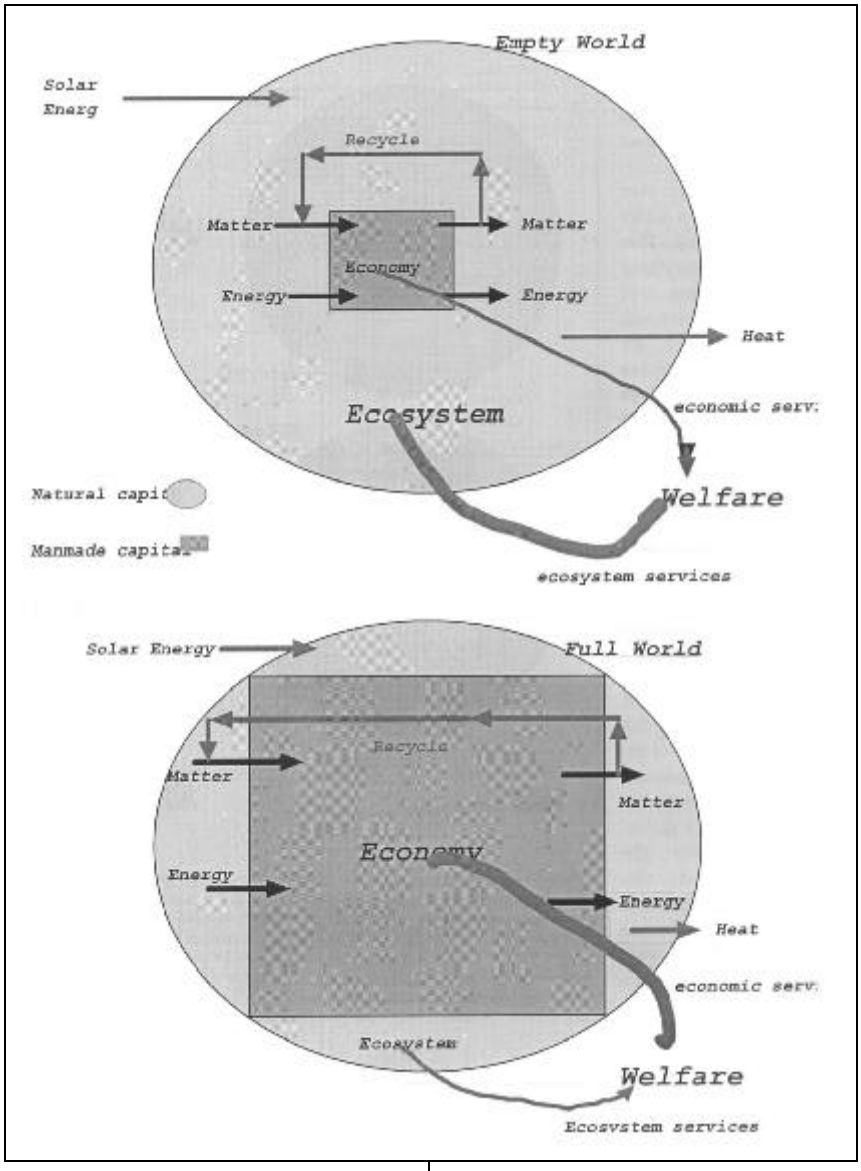

Figure I. A 'Macro' View of the Macroeconomy

sequencing is a version of the law of increasing marginal cost – for each further unit of economic expansion we must give up a more important ecosystem service. Costs increase at an increasing rate.

This first step in analysis of the preanalytic vision can be expressed graphically in a diagram (Figure II) whose basic logic goes back to William Stanley Jevons (1871) and his analysis of labor supply in terms of balancing the marginal utility of wages with the marginal disutility of labor. In Figure II the MU curve reflects the diminishing marginal utility of additions to the stock of manmade capital. The MDU curve reflects the increasing marginal cost of growth (sacrificed natural capital services, disutility of labor, disruption of community), as more natural capital is transformed into manmade capital. The optimal scale of the macroeconomy (economic limit to growth) is at point **b**, where MU = MDU, or where ab = bc, and net positive utility is a maximum.

Two further limits are noted: point **e** where MU = 0 and further growth is futile even with zero cost; and point **d**, where an ecological catastrophe is provoked, driving MDU to infinity. These "outer limits" need not occur in the order depicted. The diagram shows that growth out to point **b** is literally economic growth (benefiting us more than it costs), while growth beyond point **b** is literally uneconomic growth (costing us more than it benefits). Beyond point **b**, GNP, "that which seems to be wealth" does indeed become "a gilded index of far-reaching ruin."

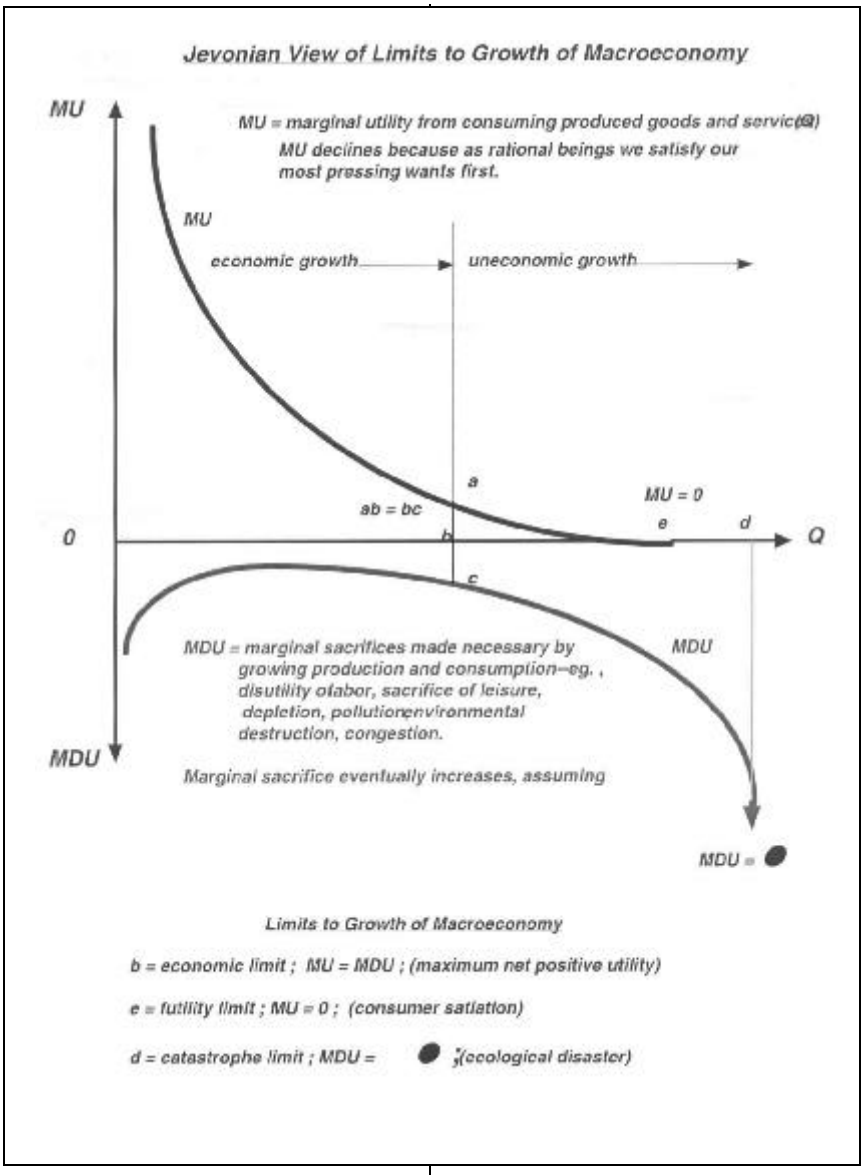

Figure II.

The concepts of optimal scale and uneconomic growth have a universal logic – they apply to the macroeconomy just as much as to microeconomic units. How did we come to forget this in macroeconomics? How did we come to ignore the existence of the MDU curve and the issue of optimal scale of the macroeconomy? I will suggest two possibilities: one is the "empty-world vision" that recognizes the logical coherence of the concept of uneconomic growth, but claims that we are not yet at that point – MU is still very large, and MDU is still negligible. Here we can discuss the factual evidence, as will be done in the next section.

The other possibility for explaining the total neglect of the costs of growth is a paradigm difference : the economy is simply not seen as a subsystem of the

ecosystem, but rather the reverse–the ecosystem is a subsystem of the economy (Figure III). The ecosystem is merely the extractive and waste disposal sector of the economy. Even if these services become scarce growth can continue forever since technology allows us to "grow around" the ecosystem sector by substitution of manmade for natural capital, following the dictates of market prices – if and when prices of natural capital rise. Nature is really nothing but a supplier of indestructible building blocks which are substitutable and superabundant. The only limit to growth is technology, and there is, supposedly, no limit to technology, *ergo* no limit to economic growth. Therefore the very notion of "uneconomic growth" makes no sense in that paradigm. Since the economy is the whole, the growth of the economy is not at the expense of anything else – there is no opportunity cost to growth. On the contrary, growth enlarges the total to be shared by the different sectors or subsystems. Growth does not increase the scarcity of anything, rather it diminishes the scarcity of everything! How can one possibly oppose growth?? Growth forever, or a steady state at optimal scale? Each is logical within its own preanalytic vision, and absurd from the viewpoint of the other. We will return later to the paradigm issue, but first let us consider some evidence in favor of the full-world version of the preanalytic vision of ecological economics.

Uneconomic Growth in Fact

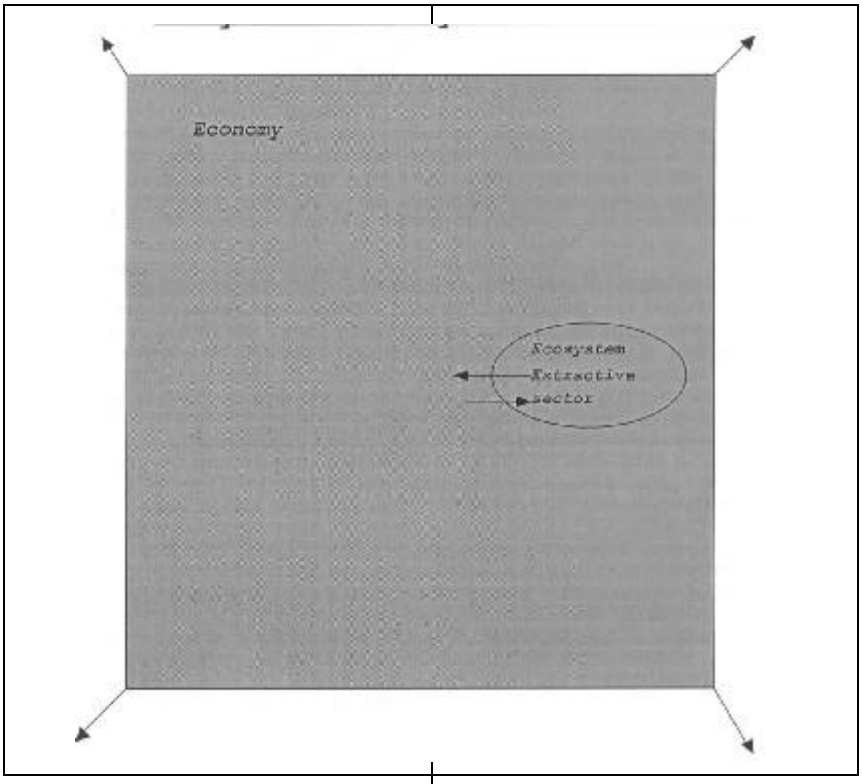

Figure III. Ecosystem as Subsystem of Macroeconomy

As noted above one might accept the theoretical possibility of uneconomic growth, but argue that it is irrelevant for practical purposes since, it could be alleged, we are nowhere near the optimal scale. We are thought to be far to the left of point **b** in Figure I – where the benefits of growth are still enormous and the costs still trivial at the margin. Economists all agree that GNP was not designed to be a measure of welfare, but only of activity. Nevertheless they assume that welfare is positively correlated with activity, so that increasing GNP will increase welfare, even if not on a one-for-one basis. This is equivalent to believing that the marginal benefit of GNP growth is greater than the marginal cost. This belief can be put to an empirical test. The results turn out not to support the belief.

Evidence for doubting the positive correlation between GNP and welfare in the United States is taken from from two sources.

First Nordhaus and Tobin[4] asked, "Is Growth Obsolete?" as a measure of welfare, hence as a proper guiding objective of policy. To answer their question they developed a direct index of welfare, called Measured Economic Welfare (MEW) and tested its correlation with GNP over the period 1929-1965. They found that, for the period as a whole, GNP and MEW were indeed positively correlated – for every six units of increase in GNP there was, on average, a four unit increase in MEW. Economists breathed a sigh of relief, forgot about MEW, and concentrated

again on GNP. Although GNP was not designed as a measure of welfare, it was and still is thought to be sufficiently well correlated with welfare to serve as a practical guide for policy.

Some twenty years later John Cobb, Clifford Cobb, and I revisited the issue and began development of our Index of Sustainable Economic Welfare (ISEW) with a review of the Nordhaus and Tobin MEW. We discovered that if one takes only the latter half of their time series (i.e., the eighteen years from 1947-1965) the positive correlation between GNP and MEW *falls* dramatically. In this most recent period – surely the more relevant for projections into the future – a six unit increase in GNP yielded on average only a one unit increase in MEW. This suggests that GNP growth at this stage of United States history may be a quite inefficient way of improving economic welfare –certainly less efficient than in the past.

The ISEW[5] was then developed to replace MEW, since the latter omitted any correction for environmental costs, did not correct for distributional changes, and included leisure which both dominated the MEW and introduced many arbitrary valuation decisions. The ISEW, like the MEW, though less so, was positively correlated with GNP up to a point (around 1980) beyond which the correlation turned slightly negative. Neither the MEW nor ISEW considered the effect of individual country GNP growth on the *global* environment, and consequently on welfare of citizens of other countries. Neither was there any deduction for legal harmful products, such as tobacco or alcohol, nor illegal harmful products such as drugs. No deduction was made for diminishing marginal utility of income resulting from growth over time (although there was a distributional correction for the higher marginal utility of income to the poor). Such considerations would further push the correlation between GNP and welfare toward the negative. Also, GNP, MEW, and ISEW all begin with Personal Consumption. Since all three measures have in common their largest single category, there is a significant autocorrelation bias, which makes the poor correlations between GNP and the two welfare measures all the more impressive.

Measures of welfare are difficult and subject to many arbitrary judgments, so sweeping conclusions should be resisted. However, it seems fair to say that for the United States since 1947, the empirical evidence that GNP growth has increased welfare is weak, and since 1980 probably nonexistent. Consequently, any impact on welfare via policies that increase GNP growth would also be weak or nonexistent. In other words, the "great benefit", for which we are urged to sacrifice the environment, community standards, and industrial peace, appears, on closer inspection, likely not even to exist.[6]

Uneconomic Growth in Two Paradigms

Within the standard neoclassical paradigm uneconomic growth sounds like an oxymoron, or at least an anomalous category. You will not find the concept in any macroeconomics textbook. But within the paradigm of ecological economics it is an obvious possibility. Let us consider why in each case.

NEOCLASSICAL PARADIGM

The paradigm or preanalytic vision of standard neoclassical economics, as noted earlier and depicted in Figure III, is that the economy is the total system, and that nature, to the extent that it is considered at all, is a sector of the economy – e.g. the extractive sector (mines, wells, forests, fisheries, agriculture, including dumps). Nature is not seen as an envelope containing, provisioning, and sustaining the economy, but as one sector of the economy similar to other sectors. If the products or services of the extractive sector should become scarce, the economy will "grow around" that particular scarcity by substituting the products of other sectors. If the substitution is difficult, new technologies, in this view, will be invented to make it easy.

The unimportance of nature is evidenced, in this view, by the falling relative prices of extractive products generally, and by the declining share of the extractive sector in total GNP. Beyond the initial provision of indestructible building blocks, nature is simply not important to the economy in the view of neoclassical economics.

That the above is a fair description of the neoclassical paradigm is attested by the elementary "principles of economics" textbooks, all of which

present the shared preanalytic vision in their initial pages. This, of course, is the famous circular flow diagram, depicting the economy as a circular flow of exchange value between firms and households – as an isolated system in which nothing enters from outside nor exits to the outside. There is no "outside", no environment. The economic animal has neither mouth nor anus – only a closed-loop circular gut – the biological version of a perpetual motion machine! Further confirmation is found by searching the indexes of macroeconomics textbooks for any entries such as "environment", "nature," "depletion," or "pollution." The absence of such entries is nearly complete. As if to reaffirm the unimportance of nature the advanced textbook chapters on growth theory are based on a neoclassical production function in which production is represented as a function of labor and capital only, with resources totally abstracted from![7]

A personal experience confirmed to me even more forcefully just how deeply ingrained this preanalytic vision really is. I think it is worth taking the time to recount this experience, which had to do with the evolution of the World Bank's 1992 World Development Report, *Development and the Environment*.

An early draft of the 1992 *WDR* had a diagram entitled "The relationship between the economy and the environment." It consisted of a square labeled "economy," with an arrow coming in labeled "inputs" and an arrow going out labeled "outputs" – nothing more. I

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worked in the Environment Department of the World Bank at that time, and was asked to review and comment on the draft. I suggested that the picture was a good idea, but that it failed to show the environment, and that it would help to have a larger box containing the one depicted, and that the large box (or circle, perhaps) would represent the environment. Then the relation between the environment and the economy would be clear – specifically that the economy is a subsystem of the environment and depends on the environment both as a source of raw material inputs and as a sink for waste outputs. The text accompanying the diagram should explain that the environment physically contains and sustains the economy by regenerating the low-entropy inputs that it requires, and by absorbing the high-entropy wastes that it cannot avoid generating, as well as by supplying other systemic ecological services. Environmentally sustainable development could then be defined as development which does not destroy these natural support functions.

The second draft had the same diagram, but with an unlabeled box drawn around the economy, like a picture frame, with no change in the text. I commented that, while this was a step forward, the larger box really had to be labeled "environment" or else it was merely decorative, and that the text had to explain that the economy was related to the environment in the ways just described.

The third draft omitted the diagram altogether. There was no further effort to draw a picture of the relation of the economy and the environment. Why was it so hard to draw such a simple picture?

By coincidence a few months later the Chief Economist of the World Bank, under whom the 1992 *WDR* was being written, happened to be on a review panel at the Smithsonian Institution discussing the book *Beyond the Limits* (Donella Meadows, et al.). In that book there was a diagram showing the relation of the economy to the ecosystem as subsystem to total system, identical to what I had suggested (and to Figure I). In the question-and-answer time I asked the Chief Economist if, looking at that diagram, he felt that the issue of the physical size of the economic subsystem relative to the total ecosystem was important, and if he thought economists should be asking the question, "What is the optimal scale of the macro economy relative to the environment that supports it?" His reply was short and definite, "That's not the right way to look at

it," he said.

Reflecting on these two experiences has strengthened my belief that the difference truly lies in our "preanalytic vision" – the way we look at it. My preanalytic vision of the economy as subsystem leads immediately to the questions: How big *is* the subsystem relative to the total system? How big *can it be* without disrupting the functioning of the total system? How big *should it be*, what is its optimal scale, beyond which further growth in scale would be uneconomic? The Chief Economist had no intention of being sucked into these subversive questions – that is not the right way to look at it, and any questions arising from that way of looking at it are simply not the right questions.

That attitude sounds rather unreasonable and peremptory, but in a way that had also been my response to the diagram in the first draft of *Development and the Environment* showing the economy receiving raw material inputs from nowhere and exporting waste outputs to nowhere. "That is not the right way to look at it," I said, and any questions arising from that picture, say, how to make the economy grow faster by speeding up throughput from an infinite source to an infinite sink, were not the right questions. Unless one has in mind the preanalytic vision of the economy as subsystem, the whole idea of sustainable development – of an economic subsystem being sustained by a larger ecosystem whose carrying capacity it must respect – makes no sense whatsoever. It was not surprising therefore that the *WDR'92* was incoherent on the subject of sustainable development, placing it in solitary confinement in a half-page box where it was implicitly defined as nothing other than "good development policy." It is the preanalytic vision of the economy as a box floating in infinite space that allows people to speak of "sustainable *growth*" (quantitative expansion) as opposed to "sustainable *development*" (qualitative improvement). The former term is a self-contradictory to those who see the economy as a subsystem of a finite and nongrowing ecosystem. The difference could not be more fundamental, more elementary, or more irreconcilable.

ECOLOGICAL ECONOMICS PARADIGM

This story of course leads to a consideration of the alternative paradigm, that of ecological economics within which uneconomic growth is an obvious concept. The big difference is to see the economy as a subsystem of the natural ecosystem.

The neoclassical "evidence" for the unimportance of nature (falling relative price of many natural resources, and small share of the extractive sector in GNP) is seen quite differently in the ecological economics paradigm. In an era of rapid extraction of resources their short-run supply will of course be high and their market price consequently will be low. Low resources prices are not evidence of nonscarcity and unimportance, but rather a consequence of rapid drawdown leading to increasing technological dependence on a large throughput of cheap resources.

As for the neoclassical claim that the small percentage of GNP arising from the extractive sector indicates its unimportance, one might as well claim that a building's foundation is unimportant because it represents only five percent of the height of the skyscraper erected above it. GNP is the sum of value *added* by labor and capital. But added to what? Resources are *that to which value is added* – the base or foundation upon which the skyscraper of added value is resting. A foundation's importance does not diminish with the growth of the structure that it supports! Nevertheless, economists habitually argue the contrary. For example, that we need not worry about global warming because the only climate-sensitive sector of the economy is agriculture, and agriculture accounts for only 3% of GNP. These economists evidently don't need to eat – perhaps they come equipped with a closed loop gut similar to what they assume in their circular flow diagram! They also need remedial reflection on the diamonds-water paradox.

If GNP growth resulted only from increments in value added to a nongrowing resource throughput, then it would likely remain *economic* growth for much longer. Such a process of qualitative improvement without quantitative increase beyond environmental capacity is what I have elsewhere[8] termed "development without growth," and suggested as a definition of "sustainable development." But that is not yet what happens in today's world. According to the World Resources

Institute, et al., per capita resource requirement rose, albeit slowly, over the period 1975-93 in Germany, Japan, and The Netherlands. It also rose in the U.S. if one does not count reductions in soil erosion. Population growth in these countries is low, but not zero, giving a further boost to total throughput growth. Since current levels of resource throughput in these countries range from 45 to 85 thousand kilograms per person per year, a level already causing severe environmental degradation, it seems a bit premature to herald the advent of the "dematerialized economy."[9]

Even new knowledge and new technology may work in both ways, enhancing or shrinking carrying capacity. New knowledge may reduce available matter-energy. For example, the greenhouse effect represents new knowledge that lowers the effective availability of fossil fuels because the capacity to absorb the dispersed CO_2 is less than previously thought. New knowledge may reveal new limits. The hole in the ozone layer is new knowledge. To suppose, as is usually done, that new knowledge will always expand the resource base and never contract it is to overspecify the content of new knowledge, which must always be something of a surprise – and not necessarily a pleasant one. Technology may lighten the load of a given scale on environmental carrying capacity and thus in effect expand it, if it allows us to squeeze more welfare from a given flow of resources. But if the new technology is the kind that simply increases the resource flow per person, then it will increase the load on carrying capacity.

"What is not reflected in the market is the value of the optimal sustainable physical scale of the economy relative to the ecosystem."

What happens, according to ecological economics, is that the economy grows by transforming its environment (natural capital) into itself (manmade capital). The optimal extent of this physical transformation (optimal scale of the economy) occurs, as previously shown, when the marginal cost of natural capital reduction is equal to the marginal benefit of manmade capital increase. This process of transformation takes place within a total environment that is finite, nongrowing, and materially closed. There is a throughput of solar energy which powers biogeochemical cycles, but that energy throughput is also finite and nongrowing. As the economic subsystem grows it becomes a larger part of the total system, and therefore must conform itself more to the limits of the total system – finitude, nongrowth, and entropy. Its growth is ultimately limited by the size of the total system of which it is a part, even under neoclassical assumptions of easy substitution of manmade for natural capital.

What is not reflected in the market is the value of the optimal sustainable physical scale of the economy relative to the ecosystem. The market does not distinguish an ecologically sustainable scale of matter-energy throughput from an unsustainable scale, just as it does not distinguish between ethically just and unjust distribution of income. Sustainability, like justice, is a value not achievable by purely individualistic market processes. Yet these values can be reflected back into market prices when the market operates under collectively instituted macro constraints designed to protect these values to which the purely individualistic market is blind.

But if manmade and natural capital are complements rather than substitutes, as ecological economics claims, then expansion of the economic subsystem would be much more stringently limited. There would be no point in expanding manmade capital beyond the capacity of remaining natural capital to complement it.

Historically, in the "empty-world" economy, man made capital was limiting and natural capital superabundant. We have now, due to demographic and economic growth, entered the "full-world" economy, in which the roles are reversed. The fish catch used to be limited by number of fishing boats (manmade capital) but is now limited by the remaining populations of fish in the sea (natural capital). What good are more fishing boats when the fish population has become the limiting factor?

When factors are complements

the one in short supply is *limiting*. If factors are substitutes then there cannot be a limiting factor. Economic logic says that we should focus attention on the limiting factor by: (a) maximizing its productivity in the short run; and (b) investing in its increase in the long run . This is a *major* implication for economic policy–economize on and invest in natural capital. Economic logic stays the same, but the identity of the limiting factor has gradually changed from manmade to natural capital, – e.g. from fishing boats to remaining fish in the sea; from saw mills to remaining forests; from irrigation systems to aquifers or rivers; from oil well drilling rigs to pools of petroleum in the ground; from engines that burn fossil fuel to the atmosphere's capacity to absorb CO_2, etc.

Viewed from the perspective of ecological economics even the usual neoclassical assumption of easy substitution of manmade for natural capital (and consequent neglect of limiting factor phenomena) provides no argument for continual growth, even though it relaxes the tightest constraint on present growth. If manmade capital substitutes for natural capital, then natural capital substitutes for manmade capital. Substitution is reversible. If our original endowment of natural capital was a good substitute for manmade capital, then why, historically, did we go to the trouble of transforming so much natural capital into manmade capital? The issue is not substitution between two types of natural resource (like substitution between exhaustible resources and renewable resources); rather it is one of substitution of capital for resources, an entirely different matter. Easy substitution between two types of natural resource will not help the world to get along without natural resources!

Since the neoclassical production function is often explained as a technical recipe, we might say that such a recipe calls for making a cake with only the cook and his kitchen. We do not need flour, eggs, sugar, and so on, nor electricity or natural gas, nor even firewood. If we want a bigger cake, the cook simply stirs faster in a bigger bowl and cooks the empty bowl in a bigger oven that somehow heats itself. Nor does the cook have any cleaning up to do, because the production recipe produces no wastes. There are no rinds, peelings, husks, shells or residues, nor is there any waste from heat from the oven to be vented. Furthermore, we can make not only a cake, but any kind of dish – a gumbo, fried chicken, a paella, bananas foster, cherries jubilee – all without worrying about the qualitatively different ingredients, or even about the quantity of an ingredient at all! Real recipes in real cookbooks, by contrast, *begin* with a list of specific ingredients and amounts.

Neoclassical believers in easy substitution have no good answer. Nor do they have a very good answer to the question: How can you make more capital without using more resources? The problem does not arise for ecological economists because they affirm from the beginning that natural and manmade capital are basically complements and only marginally substitutes.

The optimal scale of the economy is smaller, the greater is: (a) the degree of complementarity between natural and manmade capital; (b) our desire for direct experience of nature; and (c) our estimate of both the intrinsic and instrumental value of other species. The smaller the optimal scale of the economy, the sooner its physical growth becomes uneconomic.

From Permitting Growth, to Mandating Growth, to Limiting Growth

The neoclassical paradigm permits growth forever but does not really mandate it. Historically, what pushed the growth-forever ideology was not neoclassical logic, but rather the practical answer given to the problems addressed by Malthus (overpopulation), Marx (unjust distribution), and Keynes (involuntary unemployment). Growth was the common answer to all three problems.

Overpopulation would be cured by the demographic transition. When GNP per capita reaches a certain level children become too expensive in terms of other goods forgone and the birth rate automatically falls. Economic growth is the best contraceptive, as the slogan goes. Whether the product of increased per capita consumption times the decreased birth rate of "capitas" results in increasing total consumption beyond optimal scale remains an unasked question. More concretely, is it necessary for Indian per capita consumption to rise to the Swedish

level for Indian fertility to fall to the Swedish level, and if so what happens to the Indian ecosystem as a result of that level of total consumption?

Unjust distribution of wealth between classes would be rendered tolerable by growth, the rising tide that lifts all boats, to recall another slogan. Yet growth has in fact increased inequality both within and among nations. To make matters worse, even the metaphor is wrong, since a rising tide in one part of the world implies an ebbing tide somewhere else.

Unemployment would yield to increasing aggregate demand which merely required that investment be stimulated, which of course implies growth. How long can we continue to avoid unemployment by growth? Must we grow beyond optimal scale in pursuit of full employment? Another unasked question.

Continuing this time-honored tradition the World Bank's *1992 WDR* argued that more growth was also the automatic solution to the environmental problem. A so-called "environmental Kuznets curve" was discovered, which was taken to reveal an inverted U-shaped relation between GNP and a number of environmental pollutants. Consequently, one must persevere in growth because even though it initially is bad for the environment, it will later be good for the environment once we pass the hump of the inverted U.

But of course the assumption in all cases is that growth is economic, that it is making us richer rather than poorer. But now growth is becoming uneconomic. Uneconomic growth will not sustain the demographic transition and cure overpopulation. Neither will it help redress unjust distribution, nor cure unemployment. Nor will it provide extra wealth to be devoted to environmental repair and clean-up. Indirect growth-based solutions to the big problems no longer work.

We now need more direct and radical solutions to the problems of Malthus, Marx, and Keynes : population control to deal with overpopulation; redistribution to deal with excessive inequality; and measures such as a WPA-like public employer of last resort, and ecological tax reform to raise resource prices relative to labor. These must be national policies. It is utopian (or dystopian) to think of them being carried out by a world authority. Many nations have made progress in controlling their population growth, in limiting domestic income inequality, in reducing unemployment. They have also improved resource productivity by internalizing environmental and social costs into prices. But nations' efforts in this regard are undercut by the ideology of globalization – a last gasp attempt to reestablish the conditions of the empty-world economy by growing into the economic and ecological space of other countries, and into the remaining global commons.

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