The First Annual Feasta Lecture FEASTA *review* 1
Trinity College, Dublin
26th April, 1999.

uneconomic growth in theory and in fact

HERMAN E. DALY

What I'd like to talk about this evening is a concept which I think is important, although you don't hear it talked about very much. It is the idea of uneconomic growth. We hear about economic growth more than we want to sometimes, so is uneconomic growth a possibility? I want to argue that it is.

The text for my homily this evening is taken from John Ruskin: 'That which seems to be wealth may in verity be only the gilded index of far-reaching ruin'. That's my theme and I want to develop it in the following way: first I'll discuss the issue of uneconomic growth in theory. Does it make sense theoretically? Does it flow out of standard economics? I will argue that it is highly consistent with micro economic theory but that it conflicts with macro economic theory as currently done.

Then I want to discuss what I could call the paradigm issue, although I'd prefer to use an economic term. Josef Schumpeter, a great economist of the early part of this century, referred to a pre-analytic vision. Whenever we engage in analysis we don't start from scratch - we have start with some perception of the nature of the thing that we are going to take apart in analysis. That pre-analytic vision is highly determinative of what we end up with in our conclusions. It is not an act of analysis. You don't arrive with a pre-analytic vision by analysis.

Then, if I have convinced you perhaps of the theoretical meaning of uneconomic growth, what about uneconomic growth in fact? Perhaps it is just an empty theoretical box in which nothing really belongs. I want to present some evidence that in the United States and some other countries. aggregate growth is now in fact costing us more that it is worth and, at the margin, it lowers welfare.

I'll talk about the United States, I'm not going to talk about Ireland for the sufficient reason that I don't know anything about Ireland in spite of the fact that my ancestors came from here. So I thank you for sending your ancestors and sharing your genes with me. However, no information about Ireland was transferred genetically, so I have to learn something.

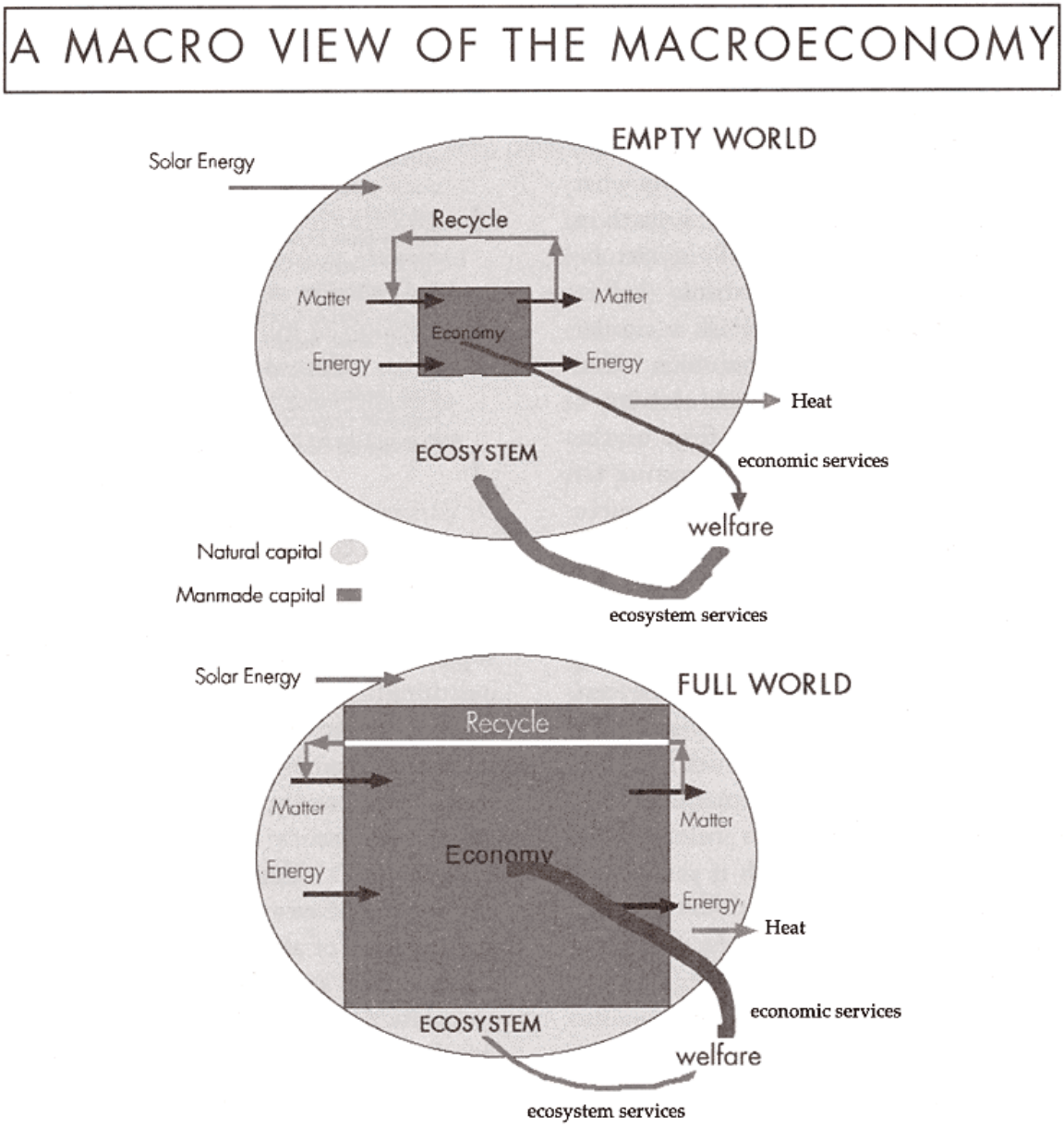
Thirdly, since I will have argued that the ideology of growth forever does not really come out of economic theory, why do we emphasise economic growth to the eclipse of uneconomic growth? I'll suggest that this is to do with fundamental problems associated with the names of Malthus, Marx and Keynes and more recently with the World Bank.

If I have time then I will also say something about globalisation as a major obstacle to recognising the existence of uneconomic growth and particularly to stopping or avoiding it. Then there will be a period for open discussion.

Let me begin then with the question, can growth in GDP - that's usually what we mean by economic growth, growth in GDP - can growth in GDP in fact be uneconomic? Well, I think before answering that we should ask a similar question in micro economics. Can growth in micro-economic activity - that is, an activity in the firm or the household - can that be uneconomic? Of course it can. The whole idea of micro economics is seeking an optimal level of some activity. As the amount of the activity increases, eventually increasing marginal costs will intersect diminishing marginal benefit. If you grow beyond that it's uneconomic. Optimisation is the essence of micro economics and that implies stopping . So the marginal cost equal marginal revenue rule, which you're all to familiar with if you've had the first course in economics, is aptly called in some textbooks the 'when to stop rule'. I like that term, the 'when to stop' rule.

Well you've taken your course in micro economics. Here's the next course in macro economics. No more equating of marginal costs to marginal revenue, no more win to stop rule, you just aggregate everything into GNP and this is supposed to grow forever. This is a curious thing. At the foundation level of economics, micro economics, the idea of uneconomic growth is fundamental, non controversial really, but when you get to macro economics you just aggregate everything. Oops, all of a sudden there's no longer a when to stop rule, no longer any question of an optimal level of overall economic activity. So, let me try to speculate a little bit on why that's the case and in order to do that, let me go back to that idea of a pre-analytic vision or paradigm that I mentioned.

I'd like first to present for the pre-analytic vision of the ecological economist.



I think that this is shared by many other economists but there are various disputes. I have called this the macro view of a macro economy. The important thing about this vision is that the economy is seen as a sub-system of a larger eco-system. The larger eco-system is finite, non-growing and materially closed. There is an inflow of solar energy into the larger system and an outflow of heat energy radiated from the larger system. As that solar energy is degraded it turns all the biogeochemical

cycles that support life, all the green stuff, it makes all those things move. The economy is seen then as an open sub-system. It's open with respect to both matter and energy. It takes in low entropy matter and energy from the eco-system and expels high entropy waste matter and energy back to the eco-system and lives off of that gradient. It lives off that degradation of materials and energy. So we start with depletion, we end with pollution. There is no way we can avoid that anymore than we can stop eating and eliminating waste. It is a natural part of the economy. It is the digestive tract and it has to be there.

Matter can be recycled. We can take some of the waste matter and use it again. One might think 'Well, let's recycle energy too' but the physicists tell us you can't do that. More precisely, they say you can do it but it will always take more energy to gather up the waste energy and bring it back and use it again than the amount of energy that you recycle. The energy cost of recycling energy is always greater than the amount of energy recycled. So it's a losing proposition and economists have to understand that. It doesn't matter what the price of energy is, it will just never be possible to recycle energy because there's a physical constraint under which we have to live, the second law of thermodynamics or the entropy law.

One more thing. Everything inside the circle in the diagram representing the ecosystem is in physical units. But we can't just analyse the economy in terms of physical units because, if we do, we reach the conclusion that the ultimate physical product of the economic process is waste matter and energy and it doesn't make much sense to have an economy whose ultimate output is waste. It is a kind of idiot machine but that's the ultimate physical product. So, if you want to make sense of the economy you have to escape from the physical dimensions into some area which imposes value or welfare, psychic satisfaction of wants. I have put that outside and just called it Welfare - satisfaction of wants - and indicated two sources of services. The first is the upper line, economic services, which are wants being served by what I've called manmade capital, the brown stuff in the economy, artefacts. The lower line represents eco-system services - the satisfaction of our wants satisfied directly by the eco-system, the green stuff. What we're really interested in as economists is to maximise total welfare, maximise the sum of those two flows of welfare. We don't want to just maximise one, we want the sum of the two to be as great as possible.

Now what happens with economic growth, is that as the economy in its physical dimensions grows by transformation of what used to be green stuff, natural capital, into brown stuff, manmade capital. The tree is cut down in the forest and converted into a table, one less tree in the forest, one more table in your house and so on. But

as it grows, there's an encroachment on the rest of the ecosystem so that's an opportunity cost. As we expand the brown flow, we reduce the green flow. and we maybe will keep doing that as long as the additions to the brown flow are greater than the subtractions from the green flow in terms of its usefulness to us. But at some point, well beyond occupying all of the green space and turning it into brown stuff, we will come to an optimum, a point beyond which further growth is going to be uneconomic, it's going to reduce eco-system services by more than it increases economic services and then growth. The scale of the economy then will have become optimal relative to the eco-system.

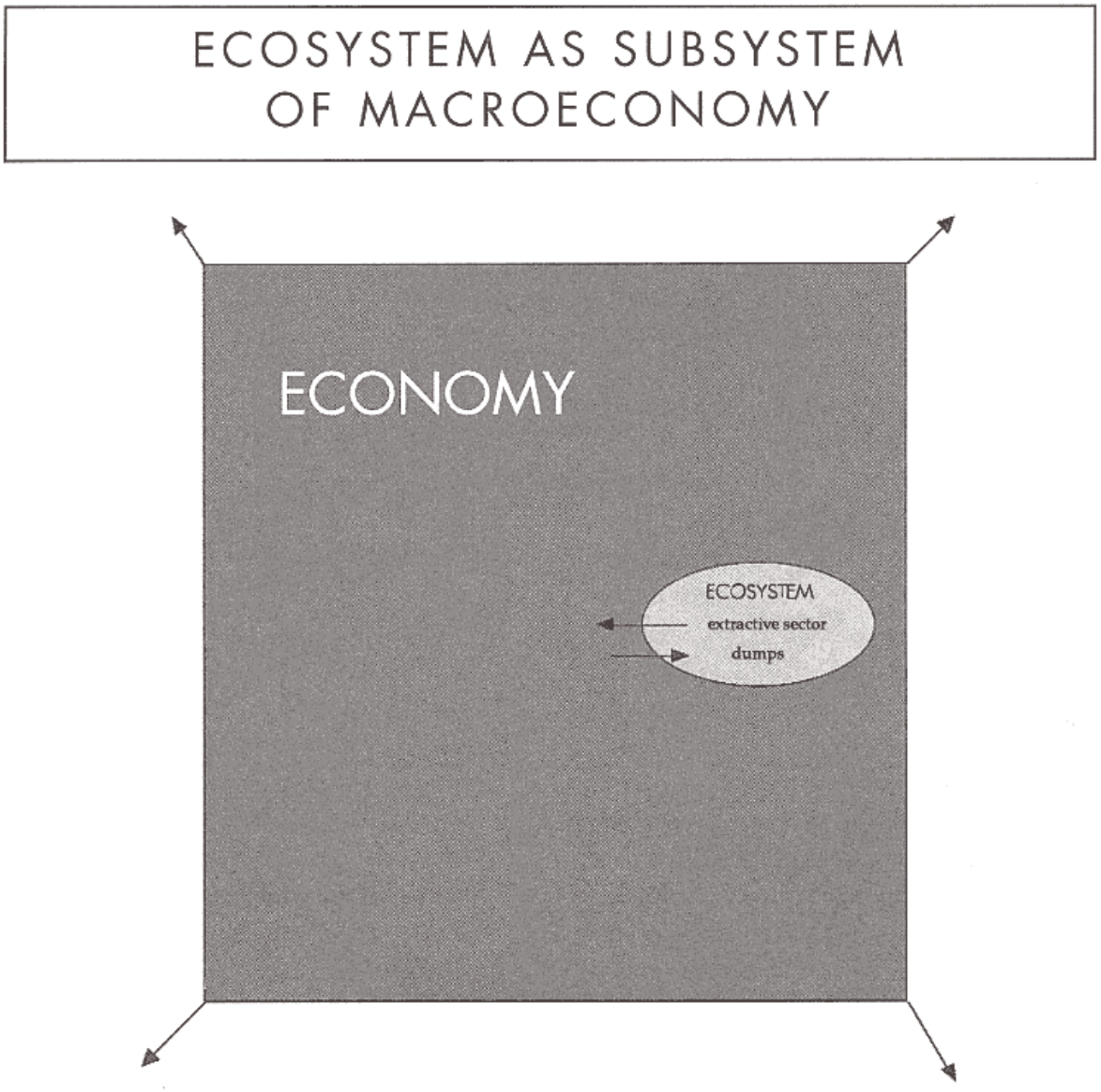
Notice here that I'm only counting human welfare. I take a very anthropocentric approach. Only human beings are counted in welfare. If we were also to count the sentient enjoyment of life by other species as a part of welfare, then that would be all the more reason for maintaining some of the green stuff, which is habitat for other species. This would make the opportunity cost of human expansion even greater, to the extent that we count reduced enjoyment of life of other sentient creatures in the equation.

Kenneth Boulding once presented a very profound theorem. He said that when something grows it gets bigger.. I call the top diagram the empty world scenario and the lower one the full world. That's a little misleading because the world is never empty. Previously it was empty of us and our furniture and full of other things Now, it is full of us and our stuff and relatively empty of what used to be there, so it's a little misleading but you know what I mean..

The two pictures are basically the same; both of them show the economy as a subsystem of a larger system that is finite, ongoing and materially closed. The economy depends on a larger eco-system for its maintenance in both cases. One case, the full world; the other case, the empty world. We may disagree on which is the most accurate representation of the world in which we live. I tend to say the full world is more accurate. Other people may say "No the empty world. We've still got all those spaces." We're living with the same analytic vision and can argue back and forth and we can present evidence to each other in an effort to convince.

Empirical work helps to establish one vision, one view, rather than the other and I think maybe that part of the debate among economists is of that nature. Probably among economists there are those with the full world view and those with the empty world view but they share the basic pre-analytic vision. That debate I think is fruitful and continues.

There's another kind of debate. Maybe it's not a debate because it starts with a very different pre-analytic vision. It says "No, that's not the right way to look at it. You're looking at the problem wrong. The economy is not a sub-system of a larger eco-system that's open and finite and so on, you've got it just backwards The economy is the total system and the eco-system is a sector and instead of that erroneous picture which you've put up it ought to look like that.



What is the eco system? Well it's the extractive sector of the economy, garbage dumps, stuff like that and we can recycle these materials faster and faster and the

economy grows. In this picture the economy is growing into the void. Economic growth in this vision does not entail encroachment on anything else. There is no opportunity cost, nothing has to be sacrificed as the economy expands, so who could be against growth? It doesn't increase the scarcity of anything else. It doesn't encroach on anything. There's no opportunity cost. In fact growth just relaxes scarcity among all parts within the economy so the idea that there is anything problematic with growth is utter nonsense and this is the way the world is.

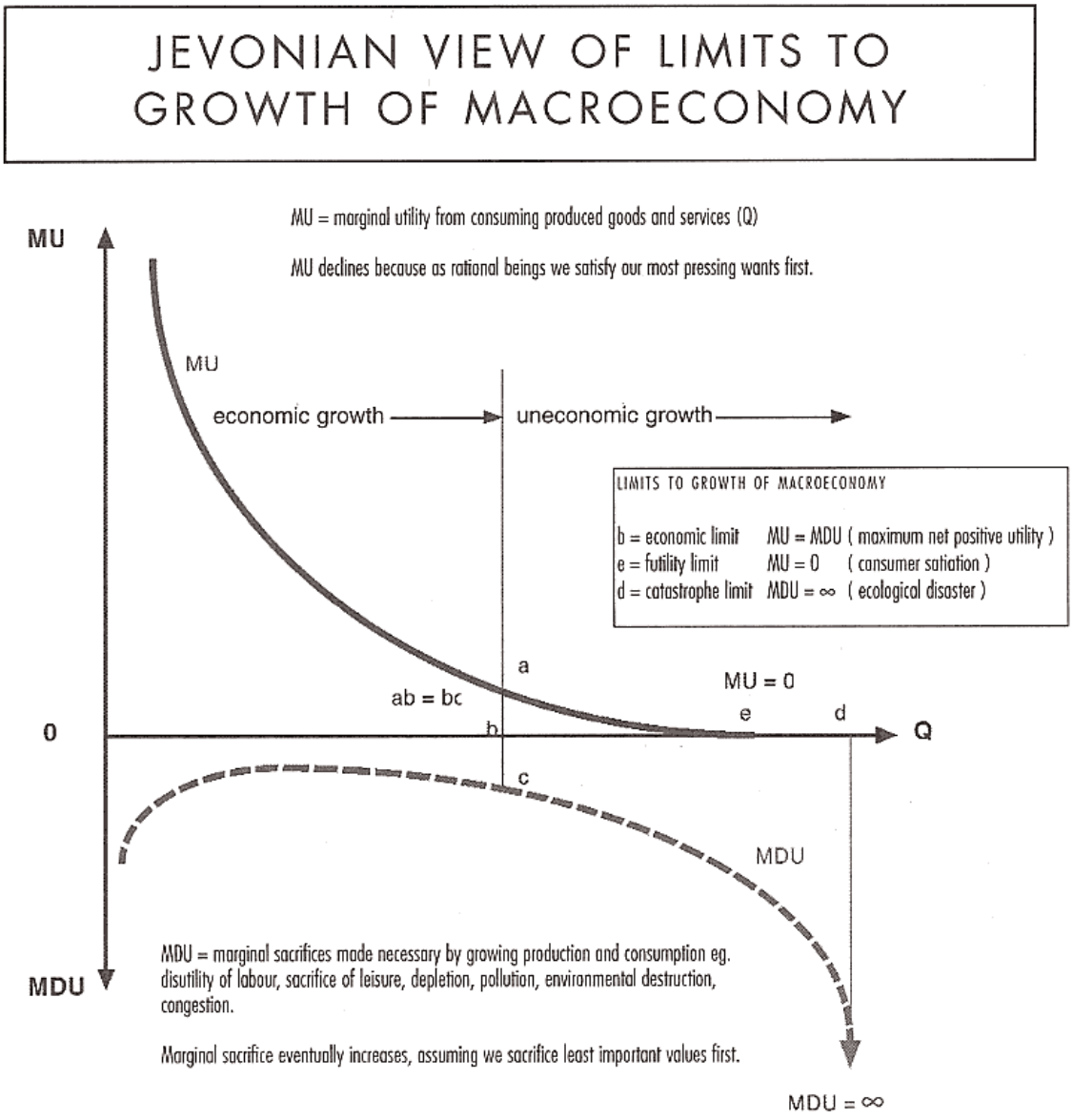
Now I think it is very difficult to argue across those two paradigms. It's like Ptolemy and Copernicus arguing back and forth. You can present evidence but basically it's just a matter of just how you want to look at it. That's not to say that one way is not better than the other, but it's hard to force the argument.

In an effort to be as fair as I can, let me make a qualification to this interpretation that I am giving. The brown stuff in this picture...in the other picture recall that I made a clear separation between physical units and welfare units - physical was inside the circle and welfare was outside the circle. Brown stuff was totally physical. To be fair to the economists they're thinking of that brown stuff as GDP rather than tonnes and barrels and so forth. So, as it has a value dimension rather than a purely physical dimension, it's not fair to say that they're thinking physical things will grow forever. What they're really thinking is that value will grow forever. But value, I would argue, while it is not reducible to physical dimensions is not independent of physical dimensions either. It has to have a physical dimension. I'll leave this as an assertion for now. Value in here, in the physical world, has to be incorporated in some way in some physical body. Yes, knowledge has value but it only enters into the functioning of the economy when its embodied in low entropy matter energy and enters into some useful function.

Well, that then is my view of the difference in the paradigms. My answer to the economists who say "all we want to do is make value grow forever, we're not trying to make matter and energy grow for ever!" is to say "Fine. In that case, let's restrict the throughput flow of matter and energy and you get busy with technology and let the value supported by that fixed flow grow forever and I'll applaud you and I'll be happy and you'll be happy." That's an easy resolution to that one if you can really make that GDP grow and grow forever with a fixed materials throughput. I think there's room for progress in that direction but I think there are also some limits.

With regard to the question of uneconomic growth in theory, we started with a pre-analytic vision. Let's take a first step towards analysis of that vision. The

continuous curve represents welfare or marginal utility or the benefits of growth. Q on the horizontal axis is, let's say, GDP. As we go out the horizontal axis we have diminishing marginal utility. I think that's a very fundamental law of economics which is well established.



I've put a dotted curve in the bottom which is the cost of GNP growth - in other words, the social and environmental sacrifices made necessary by that growing encroachment on the eco-system. I've named that a Jevonian view in honour of William Stanley Jevons, a great economist of around 1870 or so, who used that kind of diagram for a different problem but the logic is very much the same. In this diagram what is uneconomic growth? Well, economic growth is out to point B on

the horizontal axis. At point B, line AB is equal to BC. The marginal benefits of further growth are just equal to the marginal costs. Growth beyond point B is uneconomic growth. It is growth for which the distance from the horizontal down to the dotted curve is greater than the distance up to the continuous curve, growth which makes you poorer than richer. And so there's the definition of uneconomic growth, growth beyond point B.

I've distinguished several different limits to growth. One is Point B, the economic limit where marginal utility equals marginal disutility. Another is Point E, where marginal utility falls to zero. I've called this the futility limit because when you are there you have so many goods to enjoy you that don't have time to enjoy any of them Consequently, adding more isn't going to do you any good because you can't use all the stuff you've already got. It's just futile no matter how little they cost. The third is Point D, where the dotted curve takes a nose dive straight down to infinity. I call this the catastrophe limit, the ecological catastrophe limit. That's the nice scenario where you invent some marvellous new product which has an unpredicted side effect which absolutely ruins the capacity of all green plants to photosynthesise and suddenly zap. Well, the nice thing about economic limit is that it is the limit we encounter first.

The other two limits don't necessarily have to happen in the order that I've shown them. I think the catastrophe limit could occur sooner than the futility limit. However, I think the economic limit is going to come first although in the worst case scenario it might coincide with the catastrophe limit.

It seems to me that in our national accounting it would be very nice if we had two sets of accounts instead of just one. If we had one set of accounts which measured the benefits - the continuous line - and one set of accounts that measured the cost - the dotted line - and instead of adding them up, and conflating costs and benefits, we actually compared them at the margin in an effort to seek an optimal level of activity instead of simply assuming that economic activity should grow forever.

OK. I think that's all I'll say about theory. On the question of fact, is there any evidence that some countries may be beyond point B and in an era of uneconomic growth? I'll offer two pieces of evidence.

One. There were two important American economists, William Nordhaus and James Tobin. Tobin won the Nobel prize for other work. Thirty years or so ago they asked the question "Is growth obsolete?" and by obsolete I think they meant uneconomic. To answer that question they said "Look we all know that GNP was

never designed to be a measure of welfare. It is a measure of activity. Fair enough. So let's test it. Let's design an index which is a measure of welfare or which we think is a measure of welfare and then we'll correlate GNP with our attempt to measure welfare." They called their index Measured Economic Welfare, MEW and they discovered that, yes indeed, low and behold, there was a positive correlation. For the period 1929 -1965 as a whole, for every six unit increase in GNP there was on average a four unit increase in MEW. Not one to one but six to four. Not bad. Breath a sigh of relief. The conclusion they reached was that even though GNP was never intended as a measure of welfare, nevertheless it was sufficiently well correlated with welfare such that we could continue to operate on the assumption that it was a reasonable measure of welfare.

Well some twenty years later John Cobb and Clifford Cobb and I decided to take another look at this. We were developing our index of sustainable economic welfare and we thought that Tobin and Nordhaus's work was the best basis for this we could discover. We broke their time series into two segments, and discovered for the later period, the eighteen years from 1947 to 1965, the correlation was not 6:4 but a six unit increase in GDP gave you only a one unit increase in their measured economic welfare. So at a minimum it looked as if increasing GNP was becoming a less and less efficient way of increasing welfare given their own figures, their own definitions and so forth. .We then wanted to extend their work and see what happened after 1965.but for various reasons we couldn't do that because the statistical series had changed.

We didn't like their measure anyway because it didn't make any correction for changes in the distribution of income, for the depletion of natural capital and so on. So we developed another index we called the Index of Sustainable Economic Welfare. And we did the same thing that Nordhaus and Tobin did. We correlated it with GNP and there was a positive correlation between our index and GNP up to mid to late seventies then our index flattened out while GNP kept on rising. Eventually our index actually declined slightly and GDP kept on going.

We didn't make all that many changes to MEW. We just subtracted for the depletion of natural capital and made a correction for the distribution of income because we thought the assumption that an extra dollar of income to the very wealthy should be counted the same in welfare terms as an extra dollar to the poor was against economic theory. We did not make any deductions for diminishing marginal utility of income resulting from growth as a whole for countries getting richer. Nor did we deduct anything for the consumption of harmful goods such as tobacco or alcohol and so forth. So we played very conservatively and still found

that welfare as measured by this number in the United States declined as GNP kept on going up.

Now measuring welfare is a very difficult and tricky business. I don't want to say that our measure is a great measure of welfare but given the fact that with GDP, they weren't even trying to measure welfare when they designed that, and we were at least trying to do so, we probably got something of a better measure of welfare than GDP. The correlation between the two is very poor

OK. So that's just a bit on uneconomic growth in fact. I think in fact that growth in the United States now, aggregate growth, is uneconomic because it's increasing costs faster than it's increasing benefits. Do I mean by that that there's no way we can improve welfare in the United States? No, of course not. There are plenty of things that should grow and plenty of things that should decline. The problem is aggregate GDP. If you want to talk about those things which should grow you have to get away from the aggregate and talk about the parts, you have to get away from macroeconomics back to microeconomics and identify those individual things for which marginal benefits are still greater than marginal costs. That gets you away from this gross policy of just stimulating aggregate economic growth and that's the big problem.

Let me then move to the question of some historical political reasons for mandating growth. I've argued that the push for growth doesn't really come out of standard economic theory which says that there is such a thing as an optimum and you should stop there. In macroeconomics, though, we don't, we keep on growing. Where did that mandate come from? I want to suggest several places. I think it came from practical political problems faced by economists. For example, the practical problem of over-population associated with the name of Malthus. The standard cure for over-population in today's world is that of the demographic transition. If we just keep on with economic growth there comes a point beyond which, as people keep getting richer and richer, they begin to have cars and refrigerators instead of babies. Economic growth goes up, population tends to go down and the demographic transition happens automatically. So if you are worried about population, yes it's a legitimate worry but don't worry, just devote all of your efforts to economic growth and the population issue will be solved on its own.

Then we move to another big problem, the unjust distribution of income between social classes, associated largely with the name of Karl Marx although many others. What's the solution to this? Do you re-distribute? Oh no, that causes problems. We will grow so that the unjust distribution between classes is at least

rendered tolerable. I mean even if the rich get richer faster than the poor get richer, the poor shouldn't complain because they are getting absolutely richer. So the way to do that is to get aggregate growth, to make everyone better off. 'A rising tide lifts all boats' people say, which of course is not true since a rising tide in one part of the world means a ebbing tide somewhere else, but maybe for one part of the world it's true.

What about involuntary unemployment, the great problem recognised by John Maynard Keynes and of course many others. His solution was to cure unemployment by stimulating aggregate demand. How do you stimulate aggregate demand? Well many ways but principally by investment. You stimulate investment and growth and that will cure the unemployment.

Must we grow beyond the optimum scale in pursuit of full employment? It seems that's an important unasked question. Continuing in this time honoured tradition of Malthus, Marx and Keynes, in 1992 along comes the World Bank's World Economic Development Report which was dedicated that year to development and environment. "Yes," it said, "there is a problem of environmental degradation but hey look, just keep growing. As we grow more we will eventually become rich enough to pay the costs of cleaning up and improving the environment." So, in time-honoured tradition, they discovered something which they christened an 'Environmental Kuznets Curve" after Simon Kuznets who was a great statistician and economist. The idea is an inverted U-shaped curve. As economic growth continues along a horizontal axis, in Kuznets' case, inequality would increase and then reach a maximum and then inequality would decrease beyond some point. Well, they adapted that and they said we will show the increase of GNP along the horizontal axis. Then they took a number of measures of pollution of various things, very selective measures, and sure enough, they found pollution of certain things increased with GDP up to a maximum and then began to decline. Hurray! The cure to an environmental problem is just to persist in uneconomic growth Once you get beyond the hump of the U it goes down and you enter the realm of win-win solutions, everything gets better at the same time and so forth.

So, what is the point that I am making? The point is that these problems all have the same solution, more economic growth and the assumption in all cases is that growth truly is economic, that this growth really is making us richer at the margin rather than poorer. If we enter an era of uneconomic growth then uneconomic growth makes us poorer. It is not going to sustain the demographic transition and cure overpopulation. Neither will it help to redress unjust distribution, nor will it help in cleaning up the environment.

So we need more direct and radical solutions to the problems of Malthus, Marx and Keynes. Population control to deal with over-population. Redistribution to deal with excessive inequality. And, as for unemployment, I'm not sure I know the answer to that one, maybe a public sector employer of last resort, ecological tax reform, raising resource prices, job sharing, various things.

This to me is a very sobering conclusion. It seems to me that the reason we have emphasised growth politically, put it in first place, is that it would solve all these really crushing problems: overpopulation, unemployment, unjust distribution without being radical. It gives a win-win solution to all of these totally bone crushing problems. Take that away, and you have to go back to the really radical solutions and the politicians don't want to do that, the public is not ready to support them in that. If growth really is uneconomic now, then we have to face very radical kinds of solutions to fundamental problems. All the more temptation to assume "Well of course growth has to be economic" and so on.

In conclusion, let me just point out that I think these kinds of radical policies that I have alluded to without really defining - policies to deal with overpopulation, unjust distribution and environmental degradation - will have to be carried out by nation states, at the national level. This is the locus of community in today's world, this is the locus of authority to make policy. I know it's changing, I know it's shifting but that's where it exists right now and if we have globalisation then I fear that we are going to undercut the ability of nations, of communities, to carry out the very radical kinds of policies that will be needed to face these difficulties.

I should distinguish in closing, just for clarity, internationalisation from globalisation. I think internationalisation refers to the increasing importance of international trade, international relations, treaties, alliances and so forth. International of course, means between or among nations. The basic unit remains the nation, even though relations among nations become increasingly important and critical and necessary. So that's internationalisation.

Globalisation refers to the economic integration of many formally separate national economies. Globalisation, mainly by free trade and free capital mobility but also to a lesser extent by easing migration, is the effective erasure of national boundaries for economic purposes. What used to be international now becomes inter-regional; what used to be governed by comparative advantage and mutual gain now becomes governed by absolute advantage with no guarantee of mutual gain. What was many becomes one. The very word integration derives from integer of course, integer

meaning one, complete or whole. Integration is the act of combining in the one whole. Since there can be only one whole, only one unity with reference to which parts are integrated, it logically follows that global economic integration implies national economic disintegration.

By disintegration I don't mean that productive units disappear, just that they are torn out of the national context and rearranged internationally. As the saying goes, 'to make an omelette, you have to break some eggs'. To integrate the global omelette you have to disintegrate some national eggs. While it sounds nice to say 'world community' we have to face up to its costs at the national level where institutions of community really exist. If you disintegrate real community where it really is at the national level, in the name of a hopeful ideal global attenuated notion of community where it doesn't exist yet, it seems to me very problematic.

By globalising, we take away from nation states their ability to enforce and to enact the polices necessary to internalise external costs, to control population, to do the things that are necessary. We enter into a regime of standards-lowering competition in which trans-national corporations are able to play off one government against another in an attempt to get the lowest possible social and environmental costs internalised into their product and production. The big loser in this process is going to be, as I see it, the labouring class in the countries which in the past, for whatever reason, have managed to maintain high wages, lower population growth, higher standards of environmental internalisation. All of these standards will be competed downward to a world average, which will be, relatively, a low world average. So I see this globalisation as a major obstacle to enacting the kind of radical polices that are necessary in order to avoid this downward spiral of uneconomic growth.

In fact globalisation is just a way, it seems to me, of undercutting the ability of nations to deal with their own problems of overpopulation, unjust distribution, unemployment and external costs. It tends to convert many difficult but relatively tractable problems into one big intractable global problem. For that reason I think we should be very careful about celebrating and pushing globalisation and should move back towards a model of internationalisation. That's not giving up on global economic community, world community, it's a different model of community. It says that world community should be a community of communities, of nations federated into a community rather than a direct membership community in which there's no intermediation by nations and in which nations basically disappear. Well, with that provocation I think that maybe I should stop.

Biographical Sketch :

Herman E. Daly is currently Professor at the University of Maryland, School of Public Affairs. From 1988 to 1994 he was Senior Economist in the Environment Department of the World Bank. Prior to 1988 he was Alumni Professor of Economics at Louisiana State University, where he taught economics for twenty years. He is co-founder and associate editor of the journal Ecological Economics*. His interest in economic development, population, resources, and environment has resulted in over a hundred articles in professional journals and anthologies, as well as numerous books, including* Toward a Steady-State Economy *(1973);* Steady-State Economics *(1977; 1991);* Valuing the Earth *(1993);* Beyond Growth *(1996) ; and* Ecological Economics and the Ecology of Economics *(forthcoming). He is co-author with theologian John B. Cobb, Jr. of* For the Common Good *(1989;1994) which received the 1991 Grawemeyer Award for Ideas for Improving World Order. In 1996 he received the Honorary Right Livelihood Award ("alternative Nobel prize"), and the Heineken Prize for Environmental Science awarded by the Royal Netherlands Academy of Arts and Sciences.*

==========

This article is from the first* Feasta Review*, a 204-page large format book. Copies of the book are available for £15 from Green Books.