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INTRODUCTION TO DALY

If fidelity to GDP growth amounts to the religion of the modern world, then Herman Daly surely counts as a leading heretic. Arguably the preeminent figure in ecological economics, a field he did much to establish, and the author in his many works of perhaps the most fundamental and eloquently logical case against endless economic growth yet produced, Daly was born in 1938, in Houston, Texas. Then and now the headquarters of the US oil industry and epitome, after World War II, of unplanned urban sprawl, Houston fell victim in summer 2017 to Hurricane Harvey. The lumbering storm, bred on the climate-changed waters of the Gulf of Mexico, doused the city's built-over wetlands and tangle of freeways in fifty inches of rain, at a cost of scores of lives and tens of billions of dollars. Prophets can't expect hometown honours, but Houston in particular, among American cities, has flouted Daly's warnings against what he calls 'growthmania' or, more neutrally, 'growthism'. The irony—the heretic hailing from the citadel—took some time to ripen, as Daly explains below. Once he perceived that economic growth could not long continue without forfeiting its ecological basis and moral justification, he achieved a series of breakthroughs. Steady-State Economics (1977) rivals Keynes's programme of full employment or Hayek's free-market catallaxy in its visionary force, while exceeding either of these in the scale of its implications. But this was only so much abstract reasoning. Recognizing that GDP could not be displaced as a measure of social well-being and progress without some equally empirical alternative, Daly in 1989 proposed, in collaboration with the Whiteheadian philosopher John Cobb, an Index of Sustainable Human Welfare to assess the wealth of nations. More recently, he has insisted on the theoretical possibility and historical actuality of 'uneconomic growth', which 'occurs when increases in production come at an expense in resources and well-being that is worth more than the items made'. The world today is faced with a pair of contradictory terrors: the economic fear that growth will soon come to an end, and the ecological fear that it will not. Daly has conceived a form of society removed from this perplex, though not any historical dynamic that would clear the path to it.

HERMAN DALY

ECOLOGIES OF SCALE

Interview by Benjamin Kunkel

May I start by asking about your background—your upbringing and general formation. Did your parents care much about politics? Were there any influences that contributed to your ideas on ecology and economics?

I WAS BORN AND RAISED in Houston, Texas. My father had a little hardware store—he'd had to quit school around the eighth grade, at the start of the Great Depression. My mother had worked as a secretary, but the boss insisted she leave when she was pregnant with me; this was 1938. It was hard to make a profit from running a hardware store, so my parents were mostly concerned with making a living; larger questions weren't really on their mind. I worked in the store through high school and college—I took my first degree at Rice University, in Houston. Most of the people who came in were carpenters, plumbers and so on. In a general way I supported the Democrats, because they seemed more in tune with the working class—the people I identified with from my family background and from working in the hardware store. My high school was on the edge of the richest part of town, and there were kids from all sorts of backgrounds, so I got a picture of the whole spectrum—the rich, the middle class and the poor. I didn't really like the upper-class way of life. From my parents, there was the general influence of the church, of course, on moral issues.

What particular church was it?

Evangelical and Reformed—the denomination of Reinhold Niebuhr—subsequently merged with the Congregationalists to become the United Church of Christ. It was the church that German immigrants to Texas

brought with them, and that was my mother's family background. Even as a five-year-old, singing songs like, 'Jesus loves the little children, red and yellow, black and white, they are precious in His sight'—you could look out at the world and see that this was not the way things were being done: 'Why can't I play with the black kids, then?' So the realization that the way things are in the world wasn't necessarily the way they should be came rather early. But it wasn't from formal education—it was more from a Sunday School song.

Houston is an oil town, a boom town, where the population has exploded—it's now the fourth biggest urban area in the United States. Do you think that had an influence on your thinking about growth and ecology?

The home of Enron, too. I got a solid dose of the new rich and the boom mentality, and felt a certain revulsion against that excess. But what influenced me more was travelling down through Mexico with a friend, after I graduated from high school—this was in the mid-fifties—and seeing the poverty there. A lot of the customers at the hardware store were Mexican and Central American, so I kept on practicing the Spanish I'd picked up when I got home. The experience of the poverty in Mexico, as well as in Texas, was what turned me on to economics. I thought it would be a useful thing to study—development as the cure for poverty.

Was it at Rice that you first encountered the classical political economists' writings on the stationary state—Smith, Ricardo, Malthus, Mill? These would have been part of the curriculum at the time, though I don't think they would be now.

You are absolutely right—they would not be now, but they were then. The first course I took as an undergraduate was the history of economic thought, which is scarcely offered anymore. That was my introduction to the idea of limits to growth. I thought it was great: the history of economic thought included people talking about important things. That was what convinced me to major in economics.

Was the notion of the stationary state or an ultimate end to growth something you particularly concentrated on?

At the time, no, it was not. I thought it was interesting, but I bought the line that these were old ideas, and that technology and growth were

the new thing. This was when Keynesian economics was really coming into its own in the universities. Investment meant growth, which was the solution to unemployment. I remember asking my professors at the time, ‘Well, that’s great, but how long can we keep growing?’ They weren’t interested—‘Oh, the multiplier will take care of that.’ Which, looking back, was a really strange answer. But I wasn’t really confident enough at the time to raise more questions. So I put that aside and got down to studying development economics. Then I went on to Vanderbilt for graduate work, in Nashville, Tennessee.

This was going into the sixties. Did you have any personal concerns about being called up for Vietnam?

Well, no—but I was the right age. I could have been. The reason I wasn’t called up was that I was ineligible, because of the amputation of my left arm as a consequence of polio. I had polio at age eight and then, the summer I turned fifteen, I had it amputated.

Well, you clearly do very well without it—I didn’t notice!

The amputation wasn’t absolutely necessary, but the arm was atrophied, nothing but skin and bone, just a dead weight hanging off me. I had already spent far too much of my energy trying to recover the use of it. I decided I’d do better to devote my energy to things I *could* do, and stop wasting time on things I couldn’t. Fortunately, my parents were very understanding, because the operation needed their consent.

This is very interesting—if you don’t mind discussing it? Having had polio as a child often seems an important experience for an intellectual or an artist, imposing a kind of isolation for a spell. People report that they spent a lot of time reading and thinking. Do you think something like that happened for you?

For sure. From the age of eight, I couldn’t really play sports, because the arm would always get hurt. This was in Texas, a sports-mad place, where football was the big thing. As you suggest, I spent my time reading, and I enjoyed it. That was definitely important. And if you’re thinking of a lesson that might carry over into economics, the other thing I learned was that some things really are impossible. At the time, the popular idea was that if you had polio, you were supposed to get over it—if you just try

harder, nothing's impossible. At a certain point I realized I was being fed a bunch of well-intentioned lies—some things really are impossible—so I said to myself, the best adaptation when you come up against an impossibility is to recognize it and switch your energy to good things that are still possible. I suppose that's what I did. Now, you could make a big leap from that to my later economic theories: unlimited growth is impossible, so let's adapt to a steady-state economy. That was never consciously on my mind, but looking back, if you were to put me on a psychiatrist's couch, that might occur to the analyst.

You studied at Vanderbilt under Nicholas Georgescu-Roegen, author of The Entropy Law and the Economic Process, protégé of Schumpeter and Leontief—a seminal thinker for ecological economics and the de-growth movement. Was his presence on the faculty one of the things that drew you to Vanderbilt?

No, it was fortuitous, really. I took his courses because they were required. The big attraction for me was that Vanderbilt had a programme in Latin American development economics—I started off looking to growth as a solution to poverty.

Have you reflected on how your life might have been quite different if you hadn't studied with Georgescu? Or do you think that you would have come to these ideas anyway?

That's a good question. Who knows? Curiously enough, they were holding a *homenagem* for Georgescu not long ago, on the twentieth anniversary of his death, at the University of São Paulo. I don't know what would have been different without him. My life would have been easier, but I would not have learned as much. He was surely a genius and a brilliant teacher, but also, perhaps because of that, a difficult personality.

When did your intellectual reorientation take place? Was there anything punctual about it, or was it a gradual process?

I would say it was gradual. It happened in different stages. From a theoretical point of view, Georgescu's idea of the entropy law as a fundamental basis for a physical root of value in economics was very important. The grounding of economics in physical science—in physics and the laws of thermodynamics—gave me a deeper understanding of the origin of

scarcity, and of the fact that the problem of scarcity is not so easy to overcome. It certainly requires more than just appeals to technology. Then, in 1967, I went to north-eastern Brazil, the poorest region in the western hemisphere—a sort of southern Appalachia. The visible population explosion there made a real impression on me; the growth rate was very high, with a very strong class differential. The upper class used contraception, so they had maybe four kids, while the lower classes had eight or ten. I held what was almost a Marxist interpretation of population—though not one that Marx would have liked. There was a class monopoly on the means of production at that time in north-east Brazil and also a class monopoly on the means for controlling reproduction, via access to contraception—categorically denied to working people. The upshot was the permanent replenishment of the reserve army, as wages are never going to keep up with that scale of population increase. That was another dimension of exploitation. I went back to the meaning of the word ‘proletariat’, *prole* meaning children—in Portuguese and Spanish, that sense of the word comes right through, and in English, with ‘proliferation’, we still have a connection—and *proletarius*, in Roman society, those with no property except their children. Marx, however, completely shifted the meaning of the word—defining the proletariat as the non-owners of the means of production.

Why Brazil?

My wife Marcia is Brazilian, though I met her in Nashville, where she was studying. I had a job through the Ford Foundation, teaching at the University of Ceará State. My task was to prepare students from the north-east to go abroad and study economics, then come back to practice in Brazil. Students from the north-east were disadvantaged and lost out in national competitions, so this was a special preparatory course for them. That was my day job, as it were. Then the students went on strike against the military dictatorship and the university closed down, so I had an unexpected two-month vacation. I used it to undertake a study of population in the area and read, or re-read, everything I could find—John Stuart Mill on the stationary state in particular made a big impression the second time around. I’d also read Rachel Carson’s *Silent Spring*, and that was a major influence on me: the question of inter-relations, feedback loops, within an ecosystem. In my mind, these three things—Georgescu’s understanding of entropy and economics, Brazilian society and Carson’s ecology—started to cohere. I was working on a paper that

tried to generalize Leontief's input–output model of the interdependencies between economic sectors to include ecological sectors and the relations between them, so the economy became a subset of a larger ecosystem. Surprisingly enough, it was published in the University of Chicago's *Journal of Political Economy*, so that was a good thing for me.¹

Would you say, then, that the first aspect of the steady state you thought about was a steady stock of people?

Yes, I studied the demographers' model of a stationary population, which seemed to me very generalizable to populations of things other than human bodies—artifacts, all 'dissipative structures' that have birth-production rates, death-depreciation rates, life expectancies, age structures. The two seemed to fit together.

For someone of your generation, the shift from a focus on growth to a scepticism about growth's ultimate wisdom must have involved a mental revolution. The synthetic measure of GDP dates from the thirties, I believe, not before. Of the PhD theses submitted at Harvard, very few in 1944 mention economic growth at all, and then ten years later, they all do. Of course, prosperity had been very important, if conceptually ill-defined, to capitalist economies for a very long time, not to mention profit. But growth itself, as a totem concept for governments and economists, was a relatively new thing, after the war?

Yes, the growthmania really took over after World War II.

'On Economics as a Life Science' and your work on population were your first publications in what we'd now call ecological economics. There were a few others already working in the field—Kenneth Boulding, for example. Did you think of yourself as belonging under a certain rubric, with Boulding and Georgescu? How about Schumacher—was he important to you?

Boulding and Georgescu I considered my best teachers—Georgescu literally so. Though I never took courses formally from Boulding, I read everything he wrote, got to know him over the years and learned

¹ Herman Daly, 'On Economics as a Life Science', *Journal of Political Economy*, vol. 76, no. 3, May–June 1968; and 'The Population Question in Northeast Brazil: Its Economic and Ideological Dimensions', *Economic Development and Cultural Change*, vol. 18, no. 4, July 1970.

a lot from him. Later on, Schumacher, too. I thought *Small Is Beautiful* was very important, and I included him in a book I edited, *Towards a Steady-State Economy* (1973). That collection brought together work by Boulding, Georgescu, Schumacher, Garrett Hardin on population and the commons issue, and the geologist Preston Cloud on mineral resources. All this work seemed to fit together, and gave a biophysical foundation to the idea of a steady-state economy.

Your first fully authored book on the subject was Steady-State Economics, which appeared in 1977?

Yes. It's gone through several revisions and expansions. I guess the latest was 1992. The original subtitle was *The Economics of Biophysical Equilibrium and Moral Growth*.

Some readers of your work detect a certain religious orientation, without your laying any special emphasis on it. I don't really see that, beyond your sense that life, or a society, ought to have some purpose beyond economic growth.

I think that's well put. American universities, in spite of their overwhelmingly religious origins, are very secular places these days, understandably given that the main religious alternative now on offer in our culture is right-wing evangelical Trumpism. My students and colleagues are mostly faithful believers in neo-Darwinist materialism, which I think puts them in a rather difficult position when it comes to policy, which is what I've been teaching at the Maryland School of Public Policy for the last decade. I would ask them: 'What philosophical presuppositions are necessary if you're going to seriously be a student of public policy? What do you have to believe, to make it a reasonable undertaking?' My answer is that you can't be a determinist, and you can't be a nihilist—you have to believe that there are real alternatives, and you must have a criterion for saying one future is better than another. That's the minimum sort of philosophical-religious position, I think, that would be coherent with the idea of public policy, and it conflicts with 'scientific' materialism as a worldview, though not with science itself. I co-authored a book with John Cobb that looked at the connections of economics with ecology, ethics and religion.²

² *For the Common Good: Redirecting the Economy Toward Community, the Environment and a Sustainable Future*, 2nd edn, Boston 1994.

Steady-State Economics *must have taken some years of sustained work. It's a fundamental, philosophical book. Where were you working, after you came back from Brazil?*

I taught at Louisiana State University, Baton Rouge until 1988, though I had a year out at Yale in 1970, working on population, the entropy law and the environment. The first piece I wrote specifically on the idea of the steady-state economy came out of that.³

Can you tell us what a steady-state economy is and what institutional parameters it would need?

Steady-state comes from the realization that the economy is a subsystem of a larger system, the ecosphere, which is finite, non-expanding, materially closed. It's open to a flow of solar energy, but the Sun itself is non-growing. So those are the overall conditions of the parent system. If the subsystem keeps growing, it eventually coincides with the whole parent system, at which point it'll have to behave as a steady state. Purists would force me to say quasi-steady, because there is of course development, continuous evolution and qualitative change. But the Earth itself is not getting quantitatively any bigger, and there comes a point in the expansion of a subsystem where it encroaches too much on the operation of the system as a whole. We convert too much of nature into ourselves and our stuff, and there's not enough left to provide the biophysical life-support services that we need. Standard economics does not have any mechanism to register the cost of the economy's scale, relative to the biosphere. Prices don't do that. They just measure the scarcity of one resource in relation to another, not the scarcity of all resources relative to the economy's total demand.

You make a basic distinction between growth and development. Could you elaborate on that?

Growth is a physical concept. When something grows, it gets bigger, either by assimilation or accretion. Development is a qualitative concept: something gets better, it doesn't necessarily get bigger. It evolves, it changes, it improves. As analogies: a snowball rolling down a mountain

³ 'Towards a Stationary-State Economy', in John Harte and Robert Socolow, eds, *Patient Earth*, New York 1971.

is pure growth, by accretion—it's getting bigger and bigger. An embryo is growing and developing at the same time, changing qualitatively as it gets bigger. Planet Earth as a whole is not growing, but it is evolving, either in a positive or a negative way. One problem with GDP as a measure is that it conflates these two very different processes.

What might be a measure of development, once biophysical growth had stopped? A way of measuring development in terms of increased complexity, or something like that?

That's a hard thing to do, but it's an important issue. Almost by definition, quality is fundamentally unmeasurable, but we do know that some things are better than others. Complexity could be a part of it. On the other hand, simplicity could be a qualitative improvement. I don't really have a good answer to that problem yet. For now, to my mind, the important thing is to force our attention onto the qualitative dimension by limiting quantitative expansion.

If we imagine a steady-state economy that's constant in terms of its physical inputs and outputs, we could envisage that some economic growth might take place in terms of increased efficiency—the same amount of steel could be used to produce more cars, homes could be heated to the same temperature using less electricity, and so forth. But once you've reached the point of maximum biophysical efficiency, would GDP then be capable of measuring an improvement in the quality of services?

It's a good question, but for me, the important thing is to limit the physical throughput. If you do that, then what happens to GDP doesn't matter very much from an environmental perspective. Whatever people do with it is fine. A consumer-sovereignty argument makes sense in that context, because there would no longer be huge external costs of ecological degradation. An economist might argue there would be technological solutions to resource use, so we can set limitations on throughput aside. Technology is something we love, limiting throughput is something we hate, so let's just focus on the former. My reply would be: if we're so good at increasing resource productivity, why would you object to throughput limits? That would force progress onto the path of better rather than more, raising the price of resources and increasing the incentive to use them more productively. Today this is discussed as 'decoupling' of GDP from throughput. Neoclassical economists

argue that there is a very loose coupling between throughput and GDP but a tight coupling between GDP and welfare. Ecological economists think the coupling of throughput with GDP is fairly tight while the coupling of GDP and welfare is loose, or even non-existent beyond some sufficiency threshold.

Limiting biophysical throughput implies one of your basic parameters for the steady-state economy: depletion quotas. Can you explain how these would work?

The idea is to limit the rate of depletion—of fossil fuels, for example. We have something a bit like this with cap-and-trade. Governments can step in and say, fossil fuels are still privately owned—we haven't nationalized them—but we are nationalizing one thing out of your property bundle: your right to decide upon the rate of depletion. We're putting an aggregate limit on the right to deplete what you own. You have to purchase that right by auction from the government, because the total volume of depletion imposes social costs that are not reflected in your private decisions. The money that the government raises from the quota auction then becomes public revenue. You could use that revenue to reduce or eliminate some of the most regressive taxes for the poorest part of the population. So on the one hand the auction will drive up the price of petroleum, or whatever resource it is, but the scarcity rents reflected in that increased price are being redistributed back to the public. Or it could be used to finance a minimum income.

You're also in favour of a maximum income?

Yes. There's a wide acceptance of the idea of a minimum income; even Milton Friedman argued in favour of it. Why the maximum income to accompany that? If you have a limited total, and you also have a minimum income, then that implies a maximum somewhere. The question then becomes: should that maximum be such that a lot of people can receive it, or just a few? So it's a question of distribution. I don't want to argue for absolute equality, because that creates a whole set of problems of its own, but I do want to argue for limits to *inequality*. What should those limits be? In Japan, the top CEO makes something like ten times what the average worker earns; here in the US, it's more like four or five hundred times that amount.

There was a referendum in Switzerland a few years ago, that didn't quite succeed, but it was intended to cap corporate compensation as a multiple of the lowest wage.

That's an approximation of what could happen. A lot of people, including some environmentalists, criticize the idea of a steady-state economy on the grounds that it would be too market-oriented, based on the commodification of nature. I say in response, yes, but that's more or less inevitable: we pay money for food, we pay money for all the materials we need for life—to some extent we're stuck with that. But if we're obliged to commodify vital services of nature, it's even more important that there should be limits to the distribution of income. Allocation by the price mechanism is much more acceptable within a system where inequality is limited.

What sort of depletion quotas would we establish besides those for fossil fuels? The pollution of groundwater or topsoil would be harder to measure. You speak in terms of biophysical throughput, with output as a type of waste. But of course there are no undifferentiated types of energy or waste. So how do you go about doing this?

A very good and difficult question—I've struggled with that. You can go a long way with energy alone, because energy is needed to mine all the materials that go into the throughput. If you start with energy, and perhaps water and fundamental minerals like phosphorus, that would impose limits. I emphasize depletion quotas rather than pollution quotas because depletion is more concentrated, spatially and entropically, at the beginning of the throughput. Furthermore, if you limit the input, then ultimately you always limit the output, in a quantitative sense, although not qualitatively—you still have the problem of extremely toxic pollutants that are generated from remaining inputs.

One could also imagine a steady-state population where people began to eat more and more meat, causing a major environmental problem.

This is one of the things I learnt from Robert Goodland, my former boss at the World Bank: he did some studies—on his own initiative, not for the Bank—which found that agriculture, and stock-rearing in particular, is even more disastrous for the environment than industrialization. He

was a vegetarian, and I've always felt guilty about not being one myself. Having grown up in Texas, it was rather difficult. This is an area where individual actions really can have a cumulative effect if people reduce their intake of meat.

The third rail, so to speak, of your three institutional parameters for the steady state—the other two being the depletion quotas and the minimum/maximum incomes—is a cap on population. How has your thinking on that developed over the years?

The idea originated with Kenneth Boulding. He argued that the right to reproduce is treated as if it were a free good, but in reality it imposes costs on society. Even John Stuart Mill was adamant on this point: in his essay 'On Liberty', one of the few restrictions on personal freedom that he supported was on the ability to reproduce. He saw it as a legitimate area of social concern for the state. Boulding proposed a democratic way to do this: give everyone the right to reproduce once. That's going to give you a steady-state population, roughly speaking. But not everyone is able to reproduce, and not everyone wants to. They can then redistribute their rights, by sale or by gift, so that there is still macro control over the aggregate, without imposing a cast-iron rule on each and every person at the micro level.

In presenting your ideas to people, I've found that this is one of the proposals they find most difficult to contemplate.

Boulding must have had the same experience, because when he first presented the idea, he said it in all seriousness, and then a few years later he re-framed it as 'I somewhat jokingly suggested . . .' He backed off the idea in terms of its political feasibility. I have similar instincts, because people just don't want it. I'm not a dictator. I just present this as an idea. If one day people come to the realization that it's necessary to limit total population, but still want to have the maximum degree of individual freedom, then show me a better way—that's my challenge. Look at China: at one billion people, they panicked and adopted the one-child policy, a very drastic step—no brothers and sisters, aunts and uncles, a completely different family structure for the whole country. Is there a way of achieving the same goal that's less costly in terms of individual freedom? Perhaps a whole lot more women's rights and education will be enough. If we can achieve the same goal by other means that are less onerous, great.

If you've already compressed incomes quite radically, it becomes less offensive that you'd have to purchase the right to have a second child.

Yes, that's true. People might look at this and say, this is horrible because the rich would have an advantage and could always buy more licences. But the rich always have an advantage, in everything—that's the whole point of being rich. The effect of the Boulding plan on the distribution of income would be equalizing, if the rich have more children and the poor have fewer. It's the same logic as the cap-auction-trade system, in terms of combining macro control with micro freedom and variability.

It's clear that part of the antipathy to population policy is a concern for women's autonomy over their bodies. There is also the response frequently heard from progressive people: 'It's not population that's the problem, it's consumption.'

Environmental impact is the product of the number of people times per capita resource use. In other words, you have two numbers multiplied by each other—which one is more important? If you hold one constant and let the other vary, you are still multiplying. It makes no sense to me to say that only one number matters. Yet it is still very commonly said. It would, I suppose, make some sense if we were able to differentiate historically and geographically—to determine at what point in history, or in what country, which factor deserved most attention. In that sense, I would say that surely for the United States, per capita consumption is the crucial factor—but we are still multiplying it by population, so we cannot forget population. In north-east Brazil, on the other hand, population was—at the time I was there, at least—growing extremely fast, so maybe that is where the emphasis should be.

To what extent do you think about the right to have a child as fundamentally a woman's right? Given the societal shifts in attitudes towards gay marriage and parenthood that have taken place since Boulding's time, would you modify the way in which reproductive rights could be allocated?

That is an interesting question. I just have not thought in terms of gay marriage, about how that would work—because, ultimately, there has got to be a female involved somewhere. Now, I think with Boulding, you could do it various ways: you could, say, give one reproductive right to each male and female, or whatever number, and then those numbers

join to get the total. The other way of doing it relies on the notion that the female is the limitative factor in reproduction, because a woman can't be a mother nearly as often as a man could be a father. In that case, all reproductive rights would be allocated to women. When I was at Yale, writing on this, I learned that there were some feminist Marxists who were quite sympathetic to the whole idea of neo-Malthusianism—whether you do it in terms of licences, or just by making contraception more available.

What's appealing about these basic administrative proposals is that they're very simple but they would bring about radical change. You don't specify the level at which they would be implemented, but you do speak of 'the government', which implies a nation-state framework. Yet the commons of reproduction is international or universal, as are many resources, like the Earth's atmosphere. On the other hand, some resources are specific to individual countries: Chile has copper deposits, and one can imagine a depletion quota being paid out for Chilean copper mines to the Chileans, rather than the world at large. How do you envisage these depletion quotas and birth quotas functioning—would there be national or international markets? This is connected to the question of uneven development: how can growth and rising consumption take place in the poorest parts of the world, while de-growth takes place in the over-developed regions?

To take that last point first: if you want growth to continue in the poorer regions but not in the richer ones, then some borders will be required, because if it's all one big system, you're not going to be able to have different policies for each. I have tended to think in national terms, because that's where we have boundaries and the capacity to enforce laws, so I would put all this in a national context. What do you do about international relations and international trade? You could put depletion quotas on your own extraction of petroleum, but then that's going to make it more expensive in relation to imported petroleum, so you're going to start importing more. There are several ways of thinking about this question. One approach would be to have an equalizing tariff.

The difficulty is that the world—and economists in particular—have really bought into the idea of free trade. I must confess that I was a free-trader for much of my career; I used to enjoy teaching international economics to students and demonstrating the virtues of comparative advantage. But I found there were some objections that I couldn't answer, so I went back and re-read Ricardo. In his exposition

of comparative advantage, he explicitly assumes capital immobility between nations. The whole logic of each nation specializing in its own good, and freely trading with mutual advantage guaranteed, only works if capital and labour do not cross national boundaries. If capital is free to move internationally, then it will follow *absolute* advantage, going wherever it is cheapest to produce, and selling anywhere else in the world. But if capital can't cross national boundaries, then it will go to whichever national use is most productive *relatively*, in comparison with other countries, and then trade that. Clearly that's not the situation today. So the fundamental assumption of comparative advantage doesn't work. Either we have a policy of limiting capital mobility, in order to keep the world safe for comparative-advantage trading, or we have to accept the consequences of absolute advantage, namely that gains from trade need not be mutual. It is logically absurd to defend capital mobility itself, off-shoring of production, as 'free trade', as is often done.

Can you imagine a global cap-and-trade system operating over the heads, as it were, of nation-states? A system in which an American born into an overconsuming society is immediately in hock to somebody in, say, the Central African Republic, and money is transferred from the former to the latter? Or would the revenues from depletion quotas end up in national accounts? That is, if Europe, North America and Japan are charged for having an excessive biophysical throughput, how is that revenue then disbursed on an international scale?

Yes, it ultimately implies something like a world government to administer such a thing. It might be best approached by first having national systems, and you might then be able to make transfers between them. My thought is that we ought first to make transfers *within* the nation, because there are poor people within the United States—I know something about them, I feel a kinship with them. After we've all started taking care of our own to some degree, then, as a second step, let's worry about inequalities between countries. The idea of collapsing everything into a single global system used to have some sort of appeal to me, but I just don't have much confidence in global institutions. That may be a result of having spent six years at the World Bank. The UN is a better model, as a federation of interdependent national communities. What I object to is the WTO vision of a single *integrated* global economy—that, I think, is beyond our capacity right now.

Do you think that a steady-state economy is compatible, in the long run, with capitalism—in the sense that capital would still need to accumulate, which implies that it at least is growing, and yet the economy would no longer be doing so?

There are some real problems there. Insofar as capitalism has to grow, then it is incompatible with the steady state. If you recognize the need to limit throughput, then the thrust towards growth, which comes from competition in the market, faces a boundary. I wouldn't really take the view that we should just abandon capitalism and opt for eco-socialism. I would say, what we're stuck with right now is capitalism, so let's take away its power to do the most damage. That means environmental destruction and the unequal distribution of income. If you take away from the capitalist system the ability to damage the environment and to concentrate wealth beyond all reason, then I think you will have made a big step forward. Does that mean you've fundamentally abandoned capitalism? In some ways perhaps, although there would still be private ownership of the means of production. I would be in favour of breaking up monopolies, and putting limits on the concentration of wealth—it infuriates me when the 'tax reform' lobby want to do away with inheritance tax. Capitalism in the sense of financialized monopoly capitalism, geared towards continuous growth and concentration of income, is really bad. If you have a Jeffersonian-type, small-scale capitalism, operating within scale and distributive limits, and you want to call that eco-socialism, that's fine with me.

It seems that you have a lot of respect for markets, in a certain way—you don't want the ultimate size of the economy to be dictated by the market, but you're impressed by the ability of markets to create Pareto optimality—to register and optimize people's preferences.

I do, if we're talking about markets with a small 'm'. If you're going to do away with the market altogether, then you're also doing away with self-employment—people who live off making a little profit through a market, they sell and they buy, and in that process they exchange information. I always recommend to my socialist friends that they should read Oskar Lange's *On the Economic Theory of Socialism* (1938), in which he outlined a kind of market socialism, demonstrating the increased fairness that one can generate through markets. In the Soviet Union, war communism—direct allocation through central planning, no buying or

selling, physical requisitioning—broke down. They had to revert to the New Economic Policy, which relied on markets. If you try to get rid of markets, you're really creating a problem. Markets can be good servants, as well as bad masters.

It seems that a steady-state economy could be described in basic Marxian terms as simple commodity exchange—rather than $M-C-M'$, it's $C-M-C$. One commodity goes briefly into the form of money, to become another type of commodity of the same basic dimensions.

Exactly. And I think that takes away a lot of the problems, because you're focused on use value, not exchange value; and use value always has a limit, whereas exchange value just keeps expanding indefinitely. It fits the model of simple reproduction rather than expanded reproduction. Steady-state economics cannot be a system of accumulation. There has to be a levelling out, just as the classical economists said, in which population and wealth—in its physical dimensions—stop growing, though the art of living continues to improve. For a while at Louisiana State University, I taught comparative economic systems, and I included a large section on Marxist economics. I got quite far in reading through that field, and I liked a lot of it, and still do; but I am fairly allergic to some aspects—materialism, whether dialectical or otherwise, and historical determinism—also the labour theory of value runs into some big problems. What I take from Marx is that there really is such a thing as social class and exploitation at the class level. The classical economists did recognize the existence of class, of course, but they didn't emphasize the conflict nearly as much.

It strikes me that Marx is something of an outlier, if we consider him one of the classical political economists, in not having a theory, really, of the stationary state, or an end to growth. He seems to imagine that, first, capitalism collapses, whether because of the falling rate of profit, or some other factor, and only then would any kind of limits to growth come about.

Yes, Marx doesn't have much in the way of limits to growth in his picture, although some recent Marxists have come around quite a bit on that subject. One reason for this was the conflict between Marx and Malthus, which I got interested in early on with regards to population. Malthus had his apologetic side. But Marx just *hated* Malthus. I think the reason was that Marx wanted the entire grounds for poverty

to be in social relations. He didn't want any of it to be in nature—if it is in nature, then the revolution is not going to cure it, and therefore Malthus was a big ideological threat. So he went after Malthus, and I think his arguments there were fairly weak. Malthus had his own problems—but so did Marx, and Malthus was one of them.

What do you think of the dystopian steady-state scenario? You could have an essentially zero-sum economy of accumulation, where certain people were getting larger sums and other people were getting smaller sums, but with no growth in terms of GDP?

You certainly don't want to have a steady-state economy coupled with increasing inequality, because growth has been our solution to poverty; and without growth, we need another solution, which has to be redistribution, in some form or another. If you are just making the distribution more concentrated, then that really is dystopian—I agree. In fact, it seems like that is what we are currently experiencing with growth.

Would there be an ultimate limit to growth in economic value, in a steady-state economy?

I really don't know. The clear limits are in the physical dimensions. As to whether there is any limit to the psychic satisfaction that one can experience, that gets into neurology and ethics. My initial thought is that the capacity of the stomach and nervous system to consume and to get pleasure out of consumption is probably limited, but I don't know what the limits would be.

André Gorz's book Critique of Economic Reason is interesting on this topic. One argument of the book is that one of the great terrains of struggle has been over what should be commodified and what should be decommodified. Within a steady-state economy, there could be a pretty clear correspondence between dollar values and physical values—they may change quite a bit, but it's easy to work out the relationship between them. But what happens to the service economy? Will people be commodifying the increases in psychic satisfaction, so you end up with a minutely ramified service economy, or will that become a realm that's more or less decommodified?

Unfortunately I don't know the work of André Gorz, but I learned late in my career about a fundamental economic distinction that I never paid enough attention to: the simple classification of goods as either rival or

non-rival. What fits the market are rival and excludable goods. ‘Rivalness’ is a physical property—I can’t wear your shirt at the same time as you are wearing it—and ‘excludability’ is a legal concept: you have a right to prevent me from wearing your shirt, or to allow me to if you wish. There are various combinations of these categories, such as the rival but non-excludable—an open-access commons, for example, in which the market is a disaster—and the category of pure public goods, which are both non-rival and non-excludable, and then the category of the non-rival and excludable. That last combination is most pressing right now in the area of information, specifically the Internet. They are attempting to impose legal excludability on a physical system that is basically non-rival. I do not think that this is going to work. Much of the emphasis in ecological economics has been on the tragedy of the commons—of avoiding open access to rival resources. At the same time, there is the other side—avoiding the enclosure of truly non-rival goods. These are, in a sense, opposite problems. Particularly as the so-called information economy grows, the basic ‘non-rivalness’ of knowledge and information is presenting a massive problem for property-based capitalist systems.

To what extent does growthmania seem to you connected to the heavy exploitation of fossil fuels? There have been periodic concerns about ‘peak oil’, and perhaps people ought to be more concerned about this than they are.

Fossil fuels were an enormous subsidy to short-term growthism. As long as societies remained largely dependent on solar energy, as peasant agricultural systems and village economies were, then a steady state is almost built in, because the solar energy arrives at a certain rate. With fossil fuels, that rate can be speeded up—we can mine it faster and accumulate reserves, but we can’t mine the sun. Without this enormous subsidy, economies could not have gone on this growth spurt at all. Now, as you indicate, we are caught between two different possible limits to this. Is it going to be the climate-pollution limit of burning too much fossil fuel? Or is it the peak-oil limit of depletion? And that seems to go back and forth. With fracking, we’re going to burn a whole lot more, so it looks like the climate is the more effective limit.

But only if we choose to make it that?

Yes. I think that part of the reason behind climate-change denial is that if we impose limits on burning all the fossil-fuel reserves that have been discovered underground, many of the assets on the balance sheets of big

oil companies would lose their value—would become what people have started to refer to as ‘stranded assets’.

Some work is being done at the University of Vienna to measure the embodied energy of various commodities. In other words, not so much a labour theory of value, but an energy theory of value—which I know has been discussed theoretically before.

This has a long history in ecological economics. Robert Costanza, who was my partner in founding *Ecological Economics* (the journal and the society), was very active in this area. The energy theory of value was his big idea: using input–output analysis to get the embodied energy content. I have a lot of sympathy for that as a way of describing the physical interrelations of the economy: energy is a meaningful common denominator. However, I don’t buy the energy theory of value.

Is this more of a technical problem, in terms of the heterogeneous types of energy? Or is it more of a philosophical matter, in the sense that value is ultimately psychic utility?

It is both. Value is hard to reduce to a physical quantity. Ultimately, on that point, I go along with the neoclassical economists: you have to look at the utility and the marginal-utility side to explain prices and value. There are definitely biophysical roots of value, but there are also ethical-social roots; in that sense, I see it as the economist’s old scissors analogy—which blade of the scissors does the cutting, the top or the bottom, cost or utility? Howard Odum’s energy-flow understanding of the world has been very influential in ecological-economic theory. Again, this is really interesting work, but it has a fundamentally determinist side to it. This has been a problem with ecological economics: it brings together scientists—often ecologists of a materialist sort—and economists; and when it comes to matters of policy, the scientists dive under the table. Their attitude is descriptive, not prescriptive: ‘I’ll tell you how things are, but I don’t know how they ought to be.’

The critique of determinism raises the question of how historical transformation can take place. If I can play a sort of doctrinaire Marxist for a moment: Engels distinguishes between scientific and utopian socialism, where the utopian form relies on being brought about by an ethical conversion. If we could resuscitate him today, Engels might say that your steady-state economy

is too utopian, in the sense that a broad ethical conversion would have to take place to move people in this direction, whereas you don't specify a material or 'scientific' historical process that would effect the change. What do you think about that?

Not just Engels. From what I can tell, that's the official position: it's utopian, and it's not going to happen. I just don't see any alternative to an appeal to morality, whether that's sufficient or not, because I don't believe the story of determinism, and revolutionary attempts to 'help the determined really happen' have often been disasters. Even determinists now seem to have switched their appeals from history to neurobiology.

You don't believe it because you think ethical, moral, religious conversions do have a material effect on how things happen?

Yes. Purpose is causative in the world. If it is not, then we should all go back to sleep.

Right. On that subject, let me read back to you the last few lines of your 1987 essay, 'Alternative to Growthmania'. You wrote that 'the Keynesian revolution did not occur because Keynes's arguments were so compellingly lucid and unanswerable. It was the Great Depression that convinced people that something was wrong with economic theory.' You suggested it would probably take a 'great ecological spasm' to convince people that the current economic paradigm is unsustainable: 'Even in that unhappy event, it is still necessary to have an alternative vision ready to present.' Three decades later, how far down that road do you think we might be?

That's a very important question. Of course, I'm disappointed that things haven't changed, because I thought the evidence was sufficient already: even though we haven't really had a great ecological spasm, we've had plenty of costs. We've entered into an era where economic growth has become uneconomic—it's costing us more in terms of sacrificed ecosystem services than we're gaining in terms of production benefits. We haven't hit a spasm, in the sense that the ecosystem kicks us really hard, but I think maybe that's coming, precisely because we're so resistant to the idea. The Trump Administration is proclaiming it's doubling-down on growth. Maybe the difficulty here is the whole concept of 'us'. Even though growth may be costing more than it's worth in the aggregate, some people are still doing very well—the famous

1 per cent. They don't recognize that growth is hurting 'us', because it's not hurting them.

How does the century ahead look to you? What are the chances of some sort of steady-state social democracy emerging on an adequately wide scale?

My general thought is that we won't take things seriously until they get worse. In global terms, the situation does look bad. Yet, if you look at particular countries, the steady-state model doesn't seem so implausible. Take the case of Japan. Currently, it's a growth economy which is failing. Yet, both in terms of its current situation and its history, it would make sense for Japan to choose to be a successful steady-state economy instead. In pragmatic terms, Japan is declining from a very good economic position. The Japanese people may well be moving towards rejecting the growth mentality: they could decide that they are already well-off and don't need to be better and better-off each year, especially according to a fictitious measure of 'better'. They are also an island country with a scarcity of natural resources and a long history of having to live within limits.

And of being imperialist, I suppose.

Yes, but they had a long history before that of relative isolation from global commerce and the growth race. Japan also has a stable population—even a slightly declining population. Plus, they have a relatively egalitarian distribution of income, a very strong sense of community and nationality, and a tradition—certainly in their recent past—of quality over quantity in their production. Japan is halfway to becoming a steady-state economy already, whether they call it that or not. I think there are possibilities for individual countries and small units to cohere and to do things. But this runs into the great problem that people aren't willing to face today, of borders and immigration. I've gotten into a lot of trouble with my progressive friends because I don't believe in open borders. There have to be reasonable social controls and democratically enacted laws, which can't just be ignored.

What do you make of the de-growth movement in Europe?

I am favourably inclined. I meet a lot of young Europeans questioning growth. But I am still waiting for them to get beyond the slogan and develop something a little more concrete. One of their founders, Serge

Latouche, once said the de-growth movement was a slogan in search of a programme. So that is my initial feeling. On the other hand, they have recently produced a compilation containing contributions from many people—*Degrowth: A Vocabulary for a New Era*—and some of the articles in there are good. So I am hopeful that they will go beyond just chanting the word *décroissance*.

From your work, it seems that an adequate programme might be relatively simple—maybe not in its implementation, but in its basic conception, and wouldn't need many institutions.

I am hopeful, and I know Joan Martinez-Alier, a colleague for many years, has been active in the de-growth movement. Josh Farley, with whom I co-authored a book, also contributed an article to their compilation. I had a period in which I was less enthusiastic about the de-growth movement: they seemed to be a little timid on the population question, particularly immigration. They still are somewhat timid, but understandably so—not Martinez-Alier, I make an exception for him. They were quite upset with me because I said that open borders was a bad policy. I said that we should have immigration, but not unlimited immigration: there is the public interest to take into account and questions of selectivity to consider. I have found that there is a general unwillingness to think through these matters. Part of that unwillingness can be attributed to the fact that they have taken Georgescu, my old mentor, as their posthumous patron saint. In one of his articles around 1970, Georgescu gestured towards open borders; and they have jumped on that. He made those remarks in a particular context—to a group of liberal Scandinavians—and he was perhaps goading them just a bit. On the other hand, Georgescu himself was an immigrant from Romania, a refugee basically, and he was quite sympathetic to easy immigration although he never really wrote on the subject in any detail. His personal problem, however, was to escape Communist Romania—emigration not immigration. If you take justice at an individual level as your major goal, then free migration has its appeal. But the economists' usual individualism downplays the social costs to the sending country of losing those young and strong enough to migrate, and the social costs to the receiving country of absorbing immigrants and putting downward pressure on domestic wages. There are a lot of other consequences that we all need to think about honestly without the distractions of either the capitalist cheap-labour lobby or the politically correct libertarians.

We have discussed the failure of steady-state ideas to make inroads in mainstream economics as it is taught to undergraduates and graduate students. Do you think that there is much prospect of that discipline broadening to include thoughts like this in a rigorous way? Or is that work more likely to be done outside of the discipline of economics?

I think it will eventually be done in economics, but only under pressure from outside. You can already see it in some universities. The University of Vermont, particularly, has a good programme now in which this kind of thinking is involved. There was a grant that was received to train perhaps as many as fifty PhD students in ecological economics, across various universities—Vermont was one, Montreal was another. Peter Brown fostered that. There is an effort within universities to broaden economics, and little individual actions will happen. Speaking of Peter Brown, I remember that when his undergraduate institution was after him to donate money, he wrote back saying he was thinking about putting them in his will, but he didn't want to support any university whose economics department taught unlimited economic growth. I don't know that many people will apply that kind of pressure.

My sense is that there was burgeoning interest in ideas of this kind during the seventies, and then they went into hibernation to some extent, until the middle of the last decade. Did that feel like a period in the wilderness, to you?

You certainly could tell that there was a big withdrawal of interest. I do sense that maybe we are coming out of the wilderness now, if for no other reason than that the wilderness is disappearing.