



David McDonagh Reviews the Reviewer.

A Reply to Herman Daly's criticism of Julian Simon's *The Ultimate Resource*.

(Herman Daly's original review is printed at the end of David McDonagh's piece.)

Simon's book, *The Ultimate Resource* (1981) holds that we can never really know if we are running out of economic resources. This is because we cannot know what future uses we will be able to make of technical resources, for we cannot tell how future discovery or invention will greatly increase the new economic uses made of the same technical or geographical resources, or what new raw materials we will bring into a future economic use that we do not yet consider to be economic resources at all today. It is the new ideas from people that will almost certainly enable the discovery of any number of new uses that we have no idea of today or any day hitherto, but may seem obvious to all in the future. As all matter is energy, [$E=MC^2$] we do not, in principle, have any shortage of it on earth but we do not yet know how to use the energy we know is in most matter [e.g. the vast energy we know there is in water]. So far, we have only managed to harness the energy on earth in a few substances, such as wood or coal or oil. As only people can make discoveries or inventions in new economic usages of matter that we might use, Julian Simon calls people 'the ultimate resource'.

Simon has since brought out a revised and expanded second edition of his book in 1996 but the reply below is to a review of the first edition.

The Greens are not really Malthusians, of course. I suppose their ideology is in the neo- part of the neo-Malthusian label. But they are all Romantics. Romance is the reaction to and rejection of the earlier fashion of the Age of Reason, so all Romantics reject the Enlightenment paradigm of the Philosophes of France who eulogised Reason. Their master was John Locke, but their icon was Isaac Newton, who they held to have been underrated. The Romantics rejected that eulogy with the idea that reason is naïve. The chief Romantic idea is that humans are irrational. They did not like the industrial progress that had been rather rapidly made from about 1750 and they were the first Greens. The Greens do not have many, if any, ideas that were not sounded out around 1800 or so.

Malthus's main idea of diminishing returns from addition of labour to the same amount of capital or land fails, as population growth cannot hold capital or land stable by adding only labour, as Malthus thought had to be the case. In fact, it ironically cannot ever be the case. This is because people are not just a natural supply or source of labour, as Malthus assumed, but of all three factors of production instead. So we cannot get one without the other two, though Malthus required that we were bound to do that. Any person's native or genetic qualities are also economic land, their acquired skills, like the language they speak, is capital and then there is indeed what Malthus thought was all there was with adding new people, their ability to work. His main idea was that population growth was adding only labour. So his main idea was false.

Malthus never held that resources were finite. The Greens merely assume that he did, as did Simon too. Malthus is way more like Simon than Simon ever realised. Malthus never was a Green.

Simon is right to look at infinity. He is right about the inch containing infinity of points.

However, that is not the type of infinity that Simon is talking about with economic growth. There he simply means that as economics growth is about the use we make of resources, we cannot count it or weight it as we can the resources themselves. Copper, for example, is one thing in physical geography but distinctly another in economics or social geography. In the former, it can be weighed but there is no way of stably measuring it in the latter. The same material can be reused again and again, so the weight of it does not tell us about how much it might aid economic growth. Herman Daly is a college economist, so he should know all that, but he seems to know next to nothing. He seems to have not even one sound point in his article criticising Simon. (see end of this article)

Oil supply is similarly infinitely immeasurable in economic terms though it can be measured in so many gallons in geographical terms, even if we do not yet know how many gallons there are in the world (for we do not know how much there is even in physical terms). The price system is the greatest aid to research in discovering fresh physical resources, but most Greens tend to think that we would know how much oil we had anyway.

Daly says that he can count seven gallons of oil. So certain amounts of oil can be finite. But Simon is not denying that, nor does it even relate to what Simon said. Then Daly says that if he dumped the seven gallons into the seven seas then he would no longer be able to count them.

That is true, but again, it is not germane to anything that Simon says. However, Daly then says it is not true at all but rather that it is nonsense! Already, Daly shows himself up as completely muddled, for what he said was quite clearly true but also quite beside the point, though he feels it is germane but also nonsense. So he begins with two own goals. He does not get any better as we go though his backward article. Daly's point was that the oil in the sea is now not countable in the way that Simon meant and that Simon's distinction is nonsense. But Daly's analogy does not even begin to relate to the rather elementary distinction that Simon uses between technical and economic resources. It is a distinction used in almost any economics textbook but Daly, a professor of economics, writes as if he is seeing it for the first time in Simon's book. Moreover, he writes as if he simply cannot comprehend it, for it is clearly not a distinction between a known seven barrels of oil and the same amount of oil scattered through the seven seas. Daly seems to have forgotten his economic training in his Green enthusiasm. The Greens often do write as though they have no comprehension of economics but we would not expect a college economist to do so. He is paid to be an academic economist, so as Antony Flew might say, he is paid to know better.

Daly then says that Simon is taking the infinity of the points within the inch to say that we cannot step over an inch when he holds that Zeno is germane to Simon. But Zeno is not relevant at all to Simon on the infinity of economic growth for Zeno is talking about a bounded infinity within an inch where we know the limits. Simon is concerned with an infinity of economic resources and the infinite uses they might be put to. This results not only from the recycling and innovation that economically allows us to do the same work with less fuel – as when we can buy a car that consumes

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less petrol to run the same number of miles – but also from access to completely new resources – as when we ceased to use wood to replace coal, or later ceased to use coal to replace it with oil, or cease to use oil to use uranium or some other substitute. We simply have no idea of the economic uses that we can make of the different geographical resources or technical resources that we have, or even which ones that we can use in the future. We know theoretically that $E=MC^2$ so that all sorts of matter is full of energy but we do not know when we will ever tap the energy in water, for example, though we do know the energy in water that, in principle, could be used [I almost said tapped] is superabundant. What counts as resources today were not seen as such a thousand years ago. As was said by an oil sheik, Sheik Yamani, on oil running out: “the stone age didn’t end because we ran out of stones”.

Simon has not chiefly looked at the single set and its contents, as Daly says he has, but rather at the whole set as physical geography on the one hand and as economic geography along with any number additional substitutes on the other. These might emerge from invention and innovation that sees fresh aspects of the world as economic or even technical resources like, for example, the fairly recent substitute of fibre glass instead of copper in telephone lines. So what Daly says of Simon is false and it should be subjectively obviously false as it is objectively clearly false. Oil is one technical natural resource but what economics considers is maybe many rivals too, as it is concerned with the uses we can put oil to, thus it never just considers the oil. Nor is that fact hard to see. But Daly writes as if he cannot see it. He is not alone as most people, let alone most Greens do not know much about economics but one would hope that he is in a minority in the economics department of his college. More excusable is that Daly seems to think that infinity is singular and that Zeno was the

last to work on it some 2500 years ago in ancient Greece, for he is not a professional mathematician or philosopher.

However, the mathematics of infinity has moved on since Zeno. Most of the seminal work was done on infinity only in the nineteenth century, when many paradoxes concerning it were sorted out. Infinity was one of the most troubling ideas of Georg Cantor's set theory, which is today taken as basic to all mathematics. In the nineteenth century the main point Cantor made was that there is not simply just one infinity, but instead there are many kinds of different infinities. At first, it seemed weird to all the other mathematicians, or to nearly all of them, back then but it was shown there are many types of infinity, as Simon rightly says in his chapter three, a chapter that Daly repeatedly cites but seems not to have grasped. It was like Quantum Mechanics in the paradoxes it implied. Cantor saw there were many sorts of infinities; indeed there was an infinite hierarchy of them, some of them way bigger than others are. They just never come to a stop.

By the method of one to one correspondence, Cantor showed we could not pair off all numbers into a match but we could do that with some of them. The odd numbers are a one to one match for the even numbers, for example, but the irrational numbers are harder to fit to either the odd or the even numbers. We can match the odd and even numbers together but not either for the irrational numbers, like Pi, so some infinities are larger than others. Many top mathematicians in the nineteenth century thought this work of Cantor's was quite absurd, and this was their same opinion also of non-Euclidean geometry. Carl Friedrich Gauss, the top mathematician of the day, [some say of all time], thought Cantor was confused to hold infinity as a number, for Gauss said against Cantor that infinity was not only

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singular but that it had usually been treated as a 'way of speaking and not as a mathematical value' and thus was not really a number at all. This sort of criticism made Cantor an outcast for quite a long time. But similarly to non-Euclidean geometry [which Gauss endorsed, even claiming it was work done by his earlier self], Cantor won through in the long run and, by 1900, nearly all the top mathematicians alive had accepted the idea of many, or plural infinities, along with Cantor's set theory as a whole. It is not just one thing, as Daly seems to think. The top mathematician, David Hilbert, around 1900 embraced it, saying: "No one will drive us from the paradise that Cantor has created". He had been an almost lone supporter of Cantor as a young man. Set theory is today in many elementary mathematics textbooks.

So Simon is right on infinity but Daly is wrong to say that he wanted to use only the bounded infinity between 0 and 1. Simon did no such thing. Instead, he rightly said that even physical or technical resources were not bounded. So the philosopher Zeno arguing in favour of his master Parmenides is not one iota germane or relevant here. But Daly asserts that it is. That idea is mistaken.

Simon seems to know about Cantor but Daly does not. Daly seems to think infinity ends with Zeno some 2500 years ago. Simon is right to say that if there is lots of what we attempt to count such that we have no way of counting to the end then we have infinity. It is just lots that is not practically countable to a certain finite amount. Both physical and economic geographical resources are like that but, as Simon says, as we can recycle as well as we can substitute with rival economic resources means that economic resources are *intrinsically* uncountable or infinite. Any technical resource will overlap with others as substitutes in many rival uses to provide almost any ware or service. Any

economic supply will be infinite in an unlimited distinct sense to any technical resource rather than being a relationship within any one technical resource, like a bounded set with the infinite points between say one and zero, as Daly says. His criticism of Simon is completely inept there. With a particular economic usage or product there will often be substitutes as well as innovations effectively increasing or cheapening the product such that we cannot imagine gauging it completely but we can imagine that any particular technical, or physical resource, like coal for example, being, in principle, quite finite; even if it is never fully gauged in practice. Stones seem to be finite, in principle, but the many uses of stone are not.

So economic growth is not limited by the size of the planet. Simon is not saying that life is bound to go on forever. He is saying that technical resources are limited but economic resources are not. Economic growth is to do with the use we make of the technical resources not the physical technical resources themselves, as non-economists usually imagine and as the Greens tend to think it is. The Green outlook is based on ignorance of basic economics, surprisingly even when the Green is a college economist, as Herman Daly is. Thus a successful singer like Frank Sinatra is way more productive, economically, than whole factories full of ordinary workers. And he does not need to consume more than an ordinary man in order to be so. That is clearly massive economic output from a small input and is one illustration that, often, economic growth or output is not at all limited by technical resources. But that seems to be lost on the academic economist, Herman Daly.

Daly will more than likely go along with the peak oil thesis of the 1950s that held, and still holds, that oil production reached its peak, or acme, in the 1950s. It holds that oil has been in actual decline

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ever since, despite all the oil used by emerging China and India in the last twenty years, or so. Indeed, Daly clearly holds the Green thesis that the whole world could never live at the USA living standards of the 1960s, and he wants a population level of less than half of the population that we have today. The cited two emerging nations will soon most likely refute that old Green dogma; maybe they will eventually refute it so clearly that even the likes of Daly might be able to see that particular Green meme as false.

Simon does assert that all economic resources are infinite. He says that we do not know what uses we can put the materials to in the future. We can never know the actual limits to growth. It is not a physical thing but rather to do with the ways we use physical things.

Daly says that if Simon truly thinks there is no limit to productivity then he should join the Greens as they are for limiting the supply just to force greater productivity. Daly seems to overlook the backward outlook of himself and his Green friends. Why should a bunch of college buffoons hold up the supply of resources? If Daly could think a bit, he might realise there is nothing to his Green outlook.

A bet is clearly a test, but Daly seems to want to deny that plain fact.

Daly tends to think it is germane to state that the books Simon cites do not carry Simon's thesis. But if they did then why would Simon need to write his book? No author restrains himself to the books he reads for that would render any book he wrote as a sheer waste of paper but Daly writes as if it is immoral not to do so.

Daly also imagines that there is something like epistemological support to be had but that idea is a mere superstition.

If Barnett and Morse held that the scarcity of most resources, as measured by per unit extractive costs and by relative prices, was decreasing rather than increasing from 1870 to 1957 then clearly they got it right.

Why do we need to assume that we all live in times of mineralogical bonanzas? The Greens like to assume that but that hardly makes the idea realistic.

Why should we assume there are any economic epochs? Marx did, but his main idea hardly looks to be coherent. It merely seems to be a false assumption about history.

Daly then accuses Simon of using criteria to fit his case. Price when it suits him, then the quantity remaining in the ground when that suits him, to show a growth of resources each time. So Daly concludes that: "an equally shifty neomalthusian could use quantity remaining in the ground to prove increasing scarcity of minerals, and relative price to prove increasing scarcity of timber". However, as Simon mainly uses price, as that is the economic criterion, Daly's idea is inept. Simon is not concerned with the physical geography of the matter but how long a flow of increasing products can go on and it seems to Simon that economic growth can continue indefinitely.

There is not a serious debate about what is the criterion for scarcity as Daly imagines, as price, not technical volume or weight, is the criterion in economics. If the price goes up then the economic supply goes up too, but the physical resources do not increase in the physical geography sense of more, say copper, being in the ground.

Daly does not like Simon's criterion of decreasing pollution. He says: "To test this hypothesis most investigators would probably look at parts per million of various substances emitted into the air and water by human activities to see if

they have been rising or falling over time. Simon however, takes life expectancy as his index of pollution: increasing life expectancy indicates decreasing pollution. If one suggests that the increase in life expectancy mainly reflects improved control of infectious diseases, Simon redefines "pollutant" to include the smallpox virus and other germs. In this way an increase in emissions of noxious substances from the economy (what everyone but Simon means by "pollution") would not register until after it more than offset the improvement in life expectancy brought about by modern medicine. Thus Simon 'measures' pollution by burying it in an aggregate, the other component of which offsets and overwhelms it." But that any pollution is dwarfed by progress does mean that the impact of it is going down. Why look at an abstract measure that has no impact? It is clear to most people that the cities in the industrial world are way cleaner than they were in the 1950s, even if it is not clear to Daly. Gone is the fog and smog of that decade. All the main civil buildings in the centre of UK towns back then were black with industrial soot but in the 1960s they were all cleaned up in the knowledge that they would remain clean, but to have cleaned them before that decade would have been clearly futile, as clearly as washing one's football kit at half time in a football match. The fog and smog of the 1950s and earlier would have soon sooted the lot up again to be as black as ever.

Daly tends to think that physics matters more than economic well being but if we replace smog by the less obvious pollution of other "noxious substances from the economy" to increase well being, as seems to be the case from 1950 to 2000 AD then that looks like progress. Insisting on irrelevant recondite measures is being dirty in the Mary Douglas way of putting "matter in the wrong place". Daly has ironically caused thought pollution in his criticism of Simon by his muddled dogma as to what

ought to be germane, for he seems to totally lack the wit to realise what might or what might not be germane. Everything he says on Simon's book seems to be merely silly.

In the wake of this rather inept criticism, Daly suddenly says: "Simon's demonstration that resources are infinite is, in my view, a coarse mixture of simple fallacy, omission of contrary evidence from his own expert sources and gross statistical misinterpretation. Since everything else hinges on the now exploded infinite resources proposition, we could well stop here. But there are other considerations less central to the argument of the book that beg for attention." So Daly's best criticism is already shot and it seems to be all a sheer muddle. Yet this man is paid by his college to be an expert; and an expert in economics too. Daly writes as if he could not even pass an "O" level in economics.

He has yet to comprehend the Simon book, let alone to adequately criticise it. As Hegel rightly said, "The easiest thing of all is to pass judgement on what has a solid substantial content; it is more difficult to grasp it, and most of all difficult to do both together and produce the systematic exposition of it."

Daly then says "The entropy law tells us not only that coal is finite, but that you can't burn the same lump twice". But it tells us no such thing. The entropy law does not tell us that we cannot burn the same lump of coal twice. It says nothing about coal at all. What it says is that all things tend to fall apart, or become disorganised, as time goes by. It is the second law of thermodynamics. The first law holds that we cannot use up energy at all, so therefore the amount of energy is always constant. The second law holds that, in a closed system, though the amount of energy out there is the same as earlier (as the first law holds), this energy will become more diffuse with the passing of time, thus practically

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dissipated. For the next few million years the entropy law ensures that we get energy from the sun; as the sun is slowly becoming disorganised, if the second law of thermodynamics is right. Thus, energy diffuses out from the sun to the whole solar system and a lot comes to the planet earth as a result.

But, as Simon says, it is a relatively new scientific law. We do not know whether it will survive the scientific testing of the next million years, or so, but it will be way longer than that before it can be relevantly used against Simon's book. It is working in favour of what Simon says today.

Scarcity is the problem that is the spur for economic growth, of course. Daly sees that when he rather insanely suggests [cited above] that Simon should join the Greens to artificially create scarcity to force faster progress.

Daly continues to talk about the entropy law as if it is a whit germane to the backward Green case. As more or less said, the law aids growth while it is the sun, in increasing disorganisation, which supplies daily energy to this planet. In the long run the sun will expand to swallow the earth, or at least that is what is expected today.

We get other energy from inside the planet itself. Indeed, pristine life is now held to have arisen from chemosynthesis on the seabed near the vents that send up energy from the centre of the earth. This gave rise to prokaryotic life that thrived throughout the snowball earth period, when life was cut off from the sun and photosynthesis was impossible. It is now thought by the biologists that the pristine chemoautotrophs eventually mutated into something similar to today's blue green algae or cyanobacteria to innovate photosynthesis in the top ocean at a later time. Eventually the sun will endanger life on earth rather than aiding it, owing to its expected expansion, but that is

millions of years off. So the sun is like an external supply of energy to this planet. This planet is an open system. But the entropy law requires a closed system, so it is not really germane to Simon's thesis for millions of years yet; maybe even milliards of years.

After congratulating himself on his insight into infinity and the entropy law that he ignorantly thinks applies to the Simon book, Daly ironically recommends that Simon should do homework on both of those ideas before he writes any more books for adults. However, it is Daly that needs to read up on those two ideas, not Simon.

Then Daly says: "Part II of the book is on population and is dedicated to the proposition that the ultimate resource is people. The more the better, indefinitely. We are told that: 'Even the proposition that population growth must stop sometime may not be very meaningful (see Chapter 3 on 'finitude')." We have already seen Chapter 3 on finitude and have discovered that it is sheer nonsense. I will spare the reader a recitation of all the propositions about population that self-destruct with the demise of Chapter 3" But this is just to repeat the folly on infinity that Daly mentioned before. It seems that by the above quotation Daly has effectively ended his review of the book. The review is full of Daly's own folly and he has nothing useful to say other than what is very clearly just crass folly. The infinity within an inch is not the infinity of population growth or of the use than can be made of resources. There is no clear limit to population growth. Herman Daly is free to call that nonsense but it is clearly the actual case with economic growth. To call a truth nonsense is to be merely silly.

Simon likes people. So he looks forward to population growth. He rightly sees that will make things better all round. The more people the more progress we will get. As Ray Percival rightly summed

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Simon up, also in 1981, “the more people there are the easier it is to feed them”. The last 300 years seems to show us that, but Daly and many other Greens, say it is 300 years of being like a man falling but soon due to hit the ground to instantly die. Yet the Greens have no case at all against economic growth, apart from the fact that they hate progress. The recent history of the Green movement is that they have gone from one bogus scare to another. They are good at bold conjectures but not so good at looking at any refutations of their latest doomsday scare. When a scare is refuted they simply search for a new one like a dipsomaniac searches for his next drink.

Daly then says that he agrees with Simon that the more lives the better. He says that most Greens would agree: “And I think that most of my fellow neomalthusians would agree that 10 billion people are better than 2 billion -- as long as the 10 billion are not all alive at the same time!” Daly imagines that ten milliard would be worse off if they were all alive at the same time rather than just two billion, but that is a false idea.

Daly tends to think that lots more people might not only give us the likes of Einstein, or Mozart, as Simon imagines, but also of a Hitler or a Caligula. This is typical of what seems to be Daly’s almost thoughtless outlook. Hitler and Caligula were ordinary fools that are ten a penny at any time but when put at the top of an anti-social institution that is the state, (an institution that does non-stop damage), they can then do even greater than the usual state damage to the public. Indeed, the state can go into doing even more than the damage of a Hitler by adopting a very wasteful Green outlook. Hitler or Caligula had no special talent for evil but just the sort of silly thoughtlessness that Daly himself seems to have in superabundance. But the talent of Mozart seems to have been truly extraordinary, ditto Einstein. Daly typically “thinks” Hitler had a special

talent for evil. However, the main evil of Hitler was simply an extra active usage of the anti-social institution of the state. In an anarcho-liberal free market world, Hitler would be harmless, as his aims would lack any institution that could aid them. In the 1930s and 1940s, Hitler’s ideas were rather commonplace. Not so those of Einstein.

Then Daly says: “This is the crucial point: neomalthusian policies seek to maximize the cumulative total of lives ever to be lived over time, at a sufficient per-capita standard for a good life. Simon wants to maximize the number of people simultaneously alive – and, impossibly, to maximize per-capita consumption at the same time. These two contradictory strategies are possible only if resources are infinite. If they are finite then maximizing the number of simultaneous lives means a reduction in carrying capacity, fewer people in future time periods, and a lower cumulative total of lives ever lived at a sufficient standard.” Here, Daly seeks to make a straw man out of Simon. Green ideologues tend to caricature their opponents into the sort of unreal ideas that they imagine they must have if their own outlook is right. What they fail to consider is the fact that their own outlook is not right. So as the Marxist sees any liberal as pro-rich, or pro-capitalist, or anti-proletariat; or as the democrat feels, or says, that the critic of his ideal is therefore in favour of tyranny, so Daly thinks that all non-Greens want to destroy the natural world. Simon simply says the Greens have no case, He does not hold that women should breed as much as they can to reach a new ideal acme in population levels. Simon admits that population growth causes problems but he feels that people are problem-solvers. It is not that he holds that we all have some duty to breed as much as we can, as Daly says he holds. Simon actually expects prosperity to bring down family size, as was the case in ancient Rome as well as, again, in Europe since

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about 1900. However, Simon leaves it to each family to decide whether they want children or not. He does not advocate population growth. He simply says that the Greens are not right on the consequences of population growth.

Indeed, Daly, like some other readers of the first edition back in 1981, seems to see another thesis in Simon, namely that the population is due to fall owing to having greater wealth but that does not clash with his thesis that the Greens are completely wrongheaded. It merely says how he thinks things will go rather than how they might go if the population does not fall back owing to people to having greater than the average riches of the past, thus doing other things than having a large family.

Simon has no thesis that population needs to be maximised. Indeed, as Daly explicitly notes, he feels that is rather meaningless, as it could never be known when we were there; or even when we were anywhere near it. Rather what Simon is saying is that there is little, or nothing, to the Green outlook, apart from their sheer ignorance.

The Green outlook is a Tory, or court party, or statist outlook that just does not trust the wicked people. They need to be controlled by the state rather than left to breed as they see fit. Simon is a liberal who thinks that people can sort out how many people they want in their own household as long as they pay their own way. Simon never noticed that Thomas Malthus agreed with that. Malthus opposed the likes of J.J. Rousseau having children then putting them for others to look after in a Founding Home. Malthus was only opposed to having children on the dole. So he was against the Poor Laws, not against large families as such. The Greens are not really Malthusians. Malthus was nearer to Simon's outlook than to the Greens. He did expect famines, or Malthusian cutbacks, to cause the occasional and repeated dip in

the upward rise of population growth but he never held that economic growth had any foreseeable upper limit to it. He expected the sort of growth that Simon holds to be possible, but unlike Simon, that famines will make repeated short run famine-caused dips in the upward overall growth ahead as the speedy rise in population outpaced the slower growing food supply. That seems to be false, as famine seems to be due to a lack of free trade that alone allows almost automatic access to wider harvests around the world by use of the price system whenever local crops fail. So cash crops are the grand solution to the famines of the past or to the underdeveloped lands of today.

Daly says he wants the most lives to be lived but they all need to be good. He sees no problem in knowing how to achieve that. One might even want recommend him to read chapter three again of the book he is reviewing. Anyway, the people ignored him and his fellow backward Greens so he has had to face an increased standard of living even against his will owing to free population growth since 1981.

Daly expects, or he says that he expects, the quality of life to improve if only population levels fall but he makes no case for that idea in his review of Simon's book.

It is the case that the Greens are anti-life in that they are clearly misanthropic; they really do hate the human race. Again and again, they explicitly tell us that it is mankind that makes things worse. Many of their rank and file, the normal Green propagandists that we meet in the streets, show this common hatred when we meet them on their perverse campaigns. They often burst out how much they detest the human race.

Daly fails in every idea that he uses in his review of the book. He seems to this reader to have no thinking ability

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whatsoever. He says: "The difference is not, as Simon imagines, that he is "pro-life" and the neomalthusians are "anti-life." Rather it is that neomalthusians have a basic understanding of the biophysical world, whereas Simon still has not done his homework on Zeno's paradoxes of infinity, on the entropy law, on the importance of ecological life-support services provided by other species, and on the impossibility of the double maximization implied in his advocacy of 'the greatest good for the greatest number.'" But every idea he cites is inept. The Greens are against human life, but they do not seem to know much about anything, including Malthus and the biophysical aspect of the world, infinity, that economic growth aids people to be more careful about the environment by making such care more affordable. The Greens also seem not to be able to comprehend utilitarianism, that Simon shows no sign of having adopted, but that many err on in the backward colleges, for some reason.

That people like the late Bernard Williams err on utilitarianism is way clearer than why he dislikes the idea. Utilitarian ethics is very unpopular for some reason. Very often, the imagined faults in utilitarianism are based on such arguments as it implies grabbing men off the street to kill them to use their body parts to give to many others to increase utility. But such an idea would be rejected on the clear consequence that it would lower the happiness of the majority who would fear being victimised by it. Williams lacked the wit to see that, as do many others who put forward that college favour as well along with other similar fallacious arguments against utilitarianism.

Daly seems to stumble from one stupidity to another, for he immediately follows the above Green claptrap – and all he says does pander to the backward Green gallery who alone will find all his silly claptrap plausible – with the

following: "Simon seems to believe that an avoided birth today implies the eternal non-existence of a particular self-conscious person who would have enjoyed life. But as far as I know, the pairing of a particular self-consciousness with a particular birth is the greatest of mysteries. Perhaps birth control means that a particular existence is postponed rather than cancelled. In other contexts, however, Simon proclaims that 'birth control is simply a human right'." If Daly only considered the myriad number of sperm that swim up to the female's egg in any conception then he might have realised that a moment later there would be a distinct person, as it would be bound to be a different sperm that fertilised the egg. Presumably, it is the Daly misreading of the book that leads him to think that Simon wants to maximise the population rather than allowing family choice to deal with it, as is the common liberal position. Daly's misreading also leads to the other inept idea that he has, that it is somehow odd that Simon allows birth control to be a matter of family choice. Can the man not get anything right at all? As the reader gets towards the end of a book review jammed with one inept idea after another, it would rather seem that he cannot.

Daly next says: "When Kingsly Davis, Paul Ehrlich, or Garret Hardin advocate birth control they are sacrificing the unborn; but when Simon finds it convenient to his argument to endorse birth control, he is proclaiming a human right." What Daly overlooks here is that the Greens he cites are talking about what others should do, but Simon holds that it should be a personal matter for each family.

Daly concludes that Simon's book cannot stand up to criticism but he flatters himself that he is up to much as a critic. He is, indeed, a hopeless critic in his review of the book.

A review of Julian Simon's book

THE ULTIMATE RESOURCE

**by Herman Daly
From Steady State Economics (1991)**

http://enough_already.tripod.com/daly_simon.htm

This book is an all-out attack on neomalthusian or limits-to-growth thinking and a plea for more population and economic growth, both now and into the indefinite future. It is not a shotgun attack. Rather it is an attack with a single-shot rifle aimed at a single (but critical) premise of the neomalthusian position.

If Simon hits the target, then neomalthusian arguments collapse. If Simon misses the target, then all neomalthusian first principles remain unscathed, and Simon's pro-growth arguments collapse. The critical premise that Simon attacks is that of the finitude of resources, including waste absorption capacities. Other premises from which neomalthusians argue include the entropy law and the vulnerability of ecological life-support services.

Simon's theoretical argument against the finitude of resources is that: "The word "finite" originates in mathematics, in which context we all learn it as schoolchildren. But even in mathematics the word's meaning is far from unambiguous. It can have two principal meanings, sometimes with an apparent contradiction between them. For example, the length of a one-inch line is finite in the sense that it bounded at both ends. But the line within the

endpoints contains an infinite number of points; these points cannot be counted, because they have no defined size.

Therefore the number of points in that one-inch segment is not finite. Similarly, the quantity of copper that will ever be available to us is not finite, because there is no method (even in principle) of making an appropriate count of it, given the problem of the economic definition of 'copper', the possibility of creating copper or its economic equivalent from other materials, and thus the lack of boundaries to the sources from which copper might be drawn.

Two pages later he drives home the main point in connection with oil:

"Our energy supply is non-finite, and oil is an important example...the number of oil wells that will eventually produce oil, and in what quantities, is not known or measurable at present and probably never will be, and hence is not meaningfully finite."

The fallacy in the last sentence quoted is evident. If I have seven gallons of oil in seven one gallon cans, then it is countable and finite. If I dump one gallon of oil into each of the seven seas and let it mix for a year, those seven gallons would no longer be countable, and hence not "meaningfully finite," therefore infinite. This is straightforward nonsense.

The fallacy concerning the copper is obscured by the strange fact that Simon begins with a correct distinction regarding infinity of distance and infinity of divisibility of a finite distance, and then as soon as he moves from one-inch lines to copper with nothing but the word "similarly" to bridge the gap, he forgets the distinction. It would be a wonderful exercise for a class in freshman logic to find the parallel between Simon's argument and Zeno's paradox of Achilles and the tortoise. Recall that Zeno "proved" that Achilles could never catch up with a tortoise that had a finite head start on him. While Achilles traverses the

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distance from his starting point to that of the tortoise, the tortoise advances a certain distance, and while Achilles advances this distance, the tortoise makes a further advance, and so on, ad infinitum. Thus Achilles will never catch up.

Zeno's paradox confounds an infinity of subdivisions of a distance, which is finite, with an infinity of distance. This is exactly parallel to what Simon has done. He has confused an infinity of possible boundary lines between copper and noncopper with an infinity of amount of copper. We cannot, he says, make an "appropriate count" of copper because the set of all resources can be subdivided in many ways with many possible boundaries for the subset copper because resources are "infinitely" substitutable. Since copper cannot be simply counted like beans in a jar, and since what cannot be counted is not finite, it "follows" that copper is not finite, or copper is infinite.

Simon has argued from the premise of an "infinite" substitutability among different elements within a (finite) set to the conclusion of the infinity of the set itself. But no amount of rearrangement of divisions within a finite set can make the set infinite. His demonstration that mankind will never exhaust its resource base rests on the same logical fallacy as Zeno's demonstration that Achilles will never exhaust the distance between himself and the tortoise. Simon's argument therefore fails even if we grant his premise of infinite substitutability, which gets us rather close to alchemy. Copper is after all an element, and the transmutation of elements is more difficult than the phrase "infinite substitutability" implies! Indeed, Simon never tells us whether "infinite substitutability" means infinite substitutability at declining costs, constant costs, increasing costs, or at infinite costs! Of course Simon could simply assert that the total set of all resources is infinite, but this would be a

bald assertion, not a conclusion from an argument based on substitutability, which is what he has attempted.

Simon appeals to the unlimited power of technology to increase the service yielded per unit of resource as further evidence of the essentially non-finite nature of resources. If resource productivity (ratio of service to resources) were potentially infinite, then we could maintain an ever growing value of services with an ever smaller flow of resources. If Simon truly believes this, then he should join those neomalthusians who advocate limiting the resource flow precisely in order to force technological progress into the direction of improving total resource productivity and away from the recent direction of increasing intensity of resource use. Many neomalthusians advocate this even though they believe the scope for improvement is finite. If one believes the scope for improvement in resource productivity is infinite, then all the more reason to restrict the resource flow.

Those who are loud in their praise of Simon are the same people who would have bet on the tortoise, and are now betting on infinite resources. Simon's ultimate criterion for the validity of an argument seems to be willingness to "put your money where your mouth is." (See his grandstand offer on page 27 to bet anyone any amount, up to a \$10,000 total, that the real price of any resource will not rise.) He suggests that the current heavy betting by speculators that the resource tortoise will stay ahead of the Achilles of demographic and economic growth is the best available evidence of the final outcome of the race. But it could in fact be the best available evidence that speculators are interested only in the short run, or that there is a sucker born every minute! In any case "put your money where your mouth is" is a challenge to intensity of belief, not correctness of belief. It is the adman's

customary proof by bombastic proclamation.

But what about Simon's empirical evidence against resource finitude? It fares no better than his fallacious attempt at logical refutation. He leans heavily on two expert studies: "The Age of Substitutability" by Weinberg and Goeller (Science, February 20, 1976), and Scarcity and Growth by Barnett and Morse. (1) His use of these studies is amazingly selective.

From Weinberg and Goeller he quotes optimistic findings of "infinite" substitutability among resources, assuming a future low-cost, abundant energy source. This buttresses Simon's earlier premise of "infinite" subdivisibility or substitutability among resources. But it does not lend support to his fallacious conclusion that resources are infinite and therefore growth forever is possible. More to the point, however, is that Weinberg and Goeller explicitly rule out any such conclusion by stating in their very first paragraph that their "Age of Substitutability" is a steady state. It assumes zero growth in population and energy use at the highest level that Weinberg and Goeller are willing to say is technically feasible. And they express serious reservations about the social and institutional feasibility of maintaining such a high consumption steady state.

Furthermore, the levels envisioned by Weinberg and Goeller, though cornucopian by general consent, are quite modest by Simon's standards: world population in the Age of Substitutability would be only 2.5 times the present population, and world energy use would be only 12 times present use. This implies a world per-capita energy usage of only 70 percent of current U.S. per capita use. The very study that Simon appeals to for empirical support of his unlimited growth position explicitly rejects the notion of unlimited growth – a fact that Simon fails to mention.

As further empirical evidence we are served a rehash of the Barnett and Morse study. Their finding was that the scarcity of most resources, as measure by per unit extractive costs and by relative prices, was decreasing rather than increasing from 1870 to 1957. Simon gives these arguments as evidence the resources are infinite.

There is no serious dispute about the Barnett and Morse numbers, but the conclusion that resources are becoming ever less scarce is hardly justified. The neomalthusians can reply that of course the prices of resources fall during a epoch of mineralogical bonanza. But the data cannot be decisive between these two views, since they cover only that epoch.

Barnett and Morse are careful to report an important exception to the general finding of falling resource prices: timber, whose price increased during the period. Simon's way of handling this exception is interesting. He first considers only mineral resources and applies the criterion of price as a measure of scarcity, explicitly rejecting all quantity-based indices. He thus shows, decline in scarcity of mineral resources. Later, in the context of food, he considers timber. This is a fair enough context, except that he switches his criterion of scarcity from price to quantity of timber growth. In this way he can show decreasing timber scarcity by applying quantity measures, while showing decreasing minerals scarcity by applying price measures.

But an equally shifty neomalthusian could use quantity remaining in the ground to prove increasing scarcity of minerals, and relative price to prove increasing scarcity of timber. There is a serious debate about the proper measure of scarcity, as the report by Resources for the Future, Scarcity and Growth Reconsidered, (2) demonstrates, but Simon is not engaged in that serious discussion. He grabs whatever number may be moving in the direction that fits

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the needs of the argument at hand and baptizes it as an index of whatever he is talking about. Two examples will illustrate:

First, Simon claims, after warning us to "grab your hat," that pollution has really been decreasing rather than increasing. To test this hypothesis most investigators would probably look at parts per million of various substances emitted into the air and water by human activities to see if they have been rising or falling over time. Simon, however, takes life expectancy as his index of pollution: increasing life expectancy indicates decreasing pollution. If one suggests that the increase in life expectancy mainly reflects improved control of infectious diseases, Simon redefines "pollutant" to include the smallpox virus and other germs. In this way an increase in emissions of noxious substances from the economy (what everyone but Simon means by "pollution") would not register until after it more than offset the improvement in life expectancy brought about by modern medicine. Thus Simon "measures" pollution by burying it in an aggregate, the other component of which offsets and overwhelms it.

The second example is the claim (we are again told to grab our hats) that the combined increases of income and population do not increase "pressure" on the land. His proof: the absolute amount of land per farm worker has been increasing in the United States and other countries. One might have thought that this was a consequence of mechanization of agriculture and that the increasing investment per acre in machinery, fertilizer, and pesticides represented pressure on the land, not to mention pressure on mines, wells, rivers, lakes, and so on.

Simon's demonstration that resources are infinite is, in my view, a coarse mixture of simple fallacy, omission of contrary evidence from his own expert sources

and gross statistical misinterpretation. Since everything else hinges on the now exploded infinite resources proposition, we could well stop here. But there are other considerations less central to the argument of the book that beg for attention.

If, Simon notwithstanding, resources are indeed finite, then the other premises of the neomalthusians remain in vigour. The entropy law tells us not only that coal is finite, but that you can't burn the same lump twice. When burned, available energy is irreversibly depleted and unavailable energy is increased along with the dissipation of materials. If nature's sources and sinks were truly infinite, the fact that the flow between them was entropic would hardly matter. But with finite sources and sinks, the entropy law greatly increases the force of scarcity.

Although the words "entropy" or "second law of thermodynamics" remarkably do not occur once in a 400-page book on *The Ultimate Resource*, the concept is occasionally touched upon. There is a comment made in passing that marble and copper can be recycled, whereas energy cannot. This raises hopes that Simon may not be ignorant of the entropy law. These hopes are soon dashed when he softens the statement to "energy cannot be easily recycled." Later he tells us that "man's activities tend to increase the order and decrease the homogeneity of nature. Man tends to bring like elements together, to concentrate them."

That is the only part of the picture that Simon knows about. But the entropy law tells us there is another part—that to increase order in one part of the system requires the increase of disorder elsewhere, and that in net terms for the system as a whole the movement is toward disorder. In other words, more order and more matter and energy devoted to human bodies and artefacts

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mean less matter and energy and less order for the rest of the system, which includes all the other species on whose life-support services we and our economy depend. Simon is quite prepared to ruin the habitats of all other species by letting them (and future generations) bear the entropic costs of disorders that our own continuing growth entails. For Simon, however, this problem cannot exist because he believes resources and absorption capacities are infinite. But after he has once mastered the paradox of Achilles and the tortoise concerning infinity, his next homework assignment should be to find out about entropy. Until he has done these two things he should stop trying to write books for grownups about resources and population.

Part II of the book is on population and is dedicated to the proposition that the ultimate resource is people. The more the better, indefinitely. We are told that: "Even the proposition that population growth must stop sometime may not be very meaningful (see Chapter 3 on 'finitude')." We have already seen Chapter 3 on finitude and have discovered that it is sheer nonsense. I will spare the reader a recitation of all the propositions about population that self-destruct with the demise of Chapter 3. There is a puzzling methodological inconsistency between Parts I and II. In Part I Simon is the total empiricist, trusting only in the extrapolation of recent trends of falling resource prices. Any a priori argument from first principles about reversal of trends due to increasing cost, diminishing returns, the end of a bonanza, or even the S-shape of the logistic curve characteristic of all empirically observed growth processes simply does not warrant consideration by this hard-headed empiricist. Yet in Part II we find Simon refusing to project population trends and relying on the theory of demographic transition to reverse the recent trend of population growth. His own graphs, used to

demonstrate the unreliability of past population predictions, also show that a simple linear trend would have yielded much more accurate predictions in the 1920s than did the then current "twilight of parenthood" theories. Once again, whatever epistemological posture serves the immediate needs of argument is adopted. One is certainly free to choose whatever balance of theory and empiricism one thinks is most effective in getting at the truth, but the balance should not fluctuate so wildly, so often, and so opportunistically.

Simon values human life. More people are better than fewer people because each additional person's life has value for that person, his loved ones, and for society as a whole should he turn out to be a genius: an increase of 4,000 people is more likely to yield another Einstein, Mozart, or Michelangelo than an increase of only 400 people.

While I personally give zero weight to the notion that more births among today's poor and downtrodden masses will increase the probability of another Einstein or Mozart (or Hitler or Caligula?), I do agree that, other things equal, more human lives, and more lives of other species, are better than fewer.

And I think that most of my fellow neomalthusians would agree that 10 billion people are better than 2 billion -- as long as the 10 billion are not all alive at the same time!

This is the crucial point: neomalthusian policies seek to maximize the cumulative total of lives ever to be lived over time, at a sufficient per-capita standard for a good life. Simon wants to maximize the number of people simultaneously alive -- and, impossibly, to maximize per-capita consumption at the same time. These two contradictory strategies are possible only if resources are infinite. If they are finite then maximizing the number of simultaneous lives means a reduction in carrying capacity, fewer people in future time periods, and a lower cumulative

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total of lives ever lived at a sufficient standard.

The difference is not, as Simon imagines, that he is "pro-life" and the neomalthusians are "anti-life." Rather it is that neomalthusians have a basic understanding of the biophysical world, whereas Simon still has not done his homework on Zeno's paradoxes of infinity, on the entropy law, on the importance of ecological life-support services provided by other species, and on the impossibility of the double maximization implied in his advocacy of "the greatest good for the greatest number."

Simon seems to believe that an avoided birth today implies the eternal nonexistence of a particular self-conscious person who would have enjoyed life. But as far as I know, the pairing of a particular self-consciousness with a particular birth is the greatest of mysteries. Perhaps birth control means that a particular existence is postponed rather than cancelled. In other contexts, however, Simon proclaims that "birth control is simply a human right." When Kingsly Davis, Paul Ehrlich, or Garret Hardin advocate birth control they are sacrificing the unborn; but when Simon finds it convenient to his argument to endorse birth control, he is proclaiming a human right.

In this reviewer's opinion, Simon's book cannot stand up to even average critical scrutiny. Lots of bad books are written, and the best thing usually is to ignore them. I would have preferred to ignore this one, too, but judging from the publicity accorded Simon's recent articles, this book is likely to be hailed as a triumph by people who are starved for "optimism." Simon himself tells us that the optimistic conclusions he reached in his population studies helped to bring him out of a "depression of medically unusual duration," and he clearly wants to share the cure. But his cure is at best a sugar pill.

This review appeared originally in Bulletin of the Atomic Scientists, January 1982.

Notes:

1. Harold Barnett, and Chandler Morse, Scarcity and Growth (Baltimore: Johns Hopkins Press, 1963)
2. V. Kerry Smith, ed., Scarcity and Growth Reconsidered (Baltimore: Johns Hopkins Press, 1979)