Sustainability

Chapter 29

Sustainability

John O'Neill

The concept of "sustainability"

"Sustainability" has become a key normative concept in environmental policy-making and politics. It has also become a standard observation that the concept is used in a variety of different ways. Sustaining something is in its core sense about maintaining something over a period of time. The concept of sustainability originated in resource management in areas such as agriculture, forestry and fisheries. In these contexts it was used in a specific sense to describe a sustainable yield for the resource in question. What rates of extraction from the stock of resources could be maintained over a particular period of time without diminishing the stock? A fishing policy that leads to the depletion of stocks in particular fishing grounds, or agricultural practices that lead to irreversible losses of top soil in a particular area are said to be unsustainable. Reference to such specific goods remains typical in the use of the concept of sustainability in the natural sciences and resource management.

These specific uses of the concept of sustainability need to be distinguished from a more general use that the concept has enjoyed at least since the introduction of the concept of "sustainable development" in the Brundtland Report. The "Brundtland" formulation is the following: "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission on Environment and Development 1987). The report goes on to say that overriding priority should be given to the essential needs of the world's poor. In subsequent economic literature the concept of sustainability has been used to characterize an obligation to maintain human well-being over time. This general use is not tied to the use of any specific stock of resources. Indeed, one influential characterization has gone so far as to deny that sustainability should be concerned with any specific object or resource: "Sustainability as a moral obligation is a general obligation not a specific one. It is not an obligation to preserve this or preserve that" (Solow 1993a: 186). This general use involves important changes in the use of the concept. First, it describes the conditions that national or global social and economic arrangements must meet rather than some particular practices or policies about the

employment of a specific stock of resources. Second, it is conjoined to the concept of "development". Thus conjoined it can be understood in one of two ways, either as marking a constraint on development or as marking the idea that what is being maintained is not a given state but an improvement in some conditions over time.

How should sustainability in this general sense be characterized? One useful starting point is through an answer to three questions: "the sustainability of what?", "for whom" and "why?" In the economic literature that informs much public policy on sustainability following the Brundtland Report, the answer to these questions runs roughly as follows. What is to be sustained is a certain level of human welfare or well-being. In the original Brundtland formulation welfare is characterized objectively in terms of needs. In standard welfare economics it is understood in terms of preference satisfaction. For whom it is to be sustained are present and future generations of humans. The question why it should be sustained is normally given either a broadly utilitarian answer – to maximize welfare over time – or an answer that appeals to intergenerational justice – to meet the demands of distributional justice between generations. Sustainable *development* is then defined as economic and social development that at least maintains and if possible improves levels of human welfare. Typically it is argued that what is required to maintain or improve levels of human welfare over generations is for each generation to leave its successor a stock of capital assets no less than it receives. The term "sustainable" is applied to entire social and economic arrangements to capture what classically would have been called changes to "the wealth of nations".

There are clearly large normative and conceptual questions that might be raised about this characterization of sustainability. The account is welfarist: it assumes that what matters for sustainability is maintaining or improving welfare. It also assumes that only human welfare matters. One set of debates around this concept of sustainability centres on the defensibility of these assumptions. One might reject the second assumption, that only human welfare matters. The welfare of sentient beings, or more generally the good of living things, might be argued to matter independently of the welfare of human beings. The first assumption might also be rejected. Welfare is not the only value. For example, one might hold that there are impersonal values, that is, that there are certain things or states, for example biodiversity or beauty, that are valuable in themselves but not of value for the life of any being. Something close to this position about beauty was, for example, held by G. E. Moore who thought that beauty was of value even though there was no agent conscious of that beauty (Moore 1903:

85–7). Many might similarly think that the accelerated loss of species is bad even if it is not bad for any particular being. If either of these objections is telling then one might still defend a wider conception of environmental sustainability, for example, as the maintenance or improvement of levels of human and non-human welfare over time or levels of total value, including impersonal value, over time. These arguments raise important issues that deserve detailed consideration. However, they will not be my central concern in this chapter. For the remainder of this chapter I will focus on the narrower definition of sustainability in terms of the maintenance and improvement of human well-being. I will argue that even so understood there are some major problems with the way it has been characterized in the economic literature.

The paradox of sustainability

A useful starting point to the discussion is with an apparent paradox in current discussions of sustainability. Sustainability is used both specifically to characterize what is required to maintain yields of some specific resource and generally to characterize the condition to maintain and improve levels of human well-being. Sustainability in the use of some specific local goods and the general sustainability of human welfare in an economy can depart from each other without inconsistency. The unsustainable uses of specific resources can exist within a globally sustainable economy. Globally unsustainable economies can include uses of specific goods that are sustainable. However, there is a paradox that descriptions of uses of specific resources and economic characterizations of the state of economies appear to depart from each other not occasionally but systematically. Descriptions by natural scientists of the sustainability of specific resources appear to show that in a series of key resources current uses are unsustainable. When economists typically tell their story of economic development, the impact of those local failures of sustainability seems to disappear from view. As Dasgupta notes, there is "a puzzle created by conflicting intuitions that have been derived from two different empirical perspectives concerning the question of whether the character of contemporary economic development is sustainable":

> On the one hand, if we look at specific resources and services (e.g. fresh water, ecosystem services, and the atmosphere as a carbon sink), there is convincing evidence that the current rates of utilization are unsustainable. On the other hand, if we look at historical trends in the prices of marketed resources or the recorded growth

> in GNP per capita in countries that are currently rich, resource scarcities would not appear yet to have bitten. (Dasgupta 2001: 87–8)

How should this conflict of perspectives be resolved? One response is to question the accounts of sustainability and sustainable development that underpin some influential versions of the economic characterization of the concepts. Changes in the monetary prices of market goods and market transactions need not be good indicators either of how far levels of human well-being are maintained or improved or of how far the conditions exist for their continued maintenance in the future. Hence, the continuing growth in GDP is not a good measure of sustainability: "GDP is an inadequate metric to gauge well-being over time particularly in its economic, environmental, and social dimensions, some aspects of which are often referred to as *sustainability*" (Stiglitz *et al*. 2009: 8, emphasis original). Thus stated the objection raises important questions about how well-being should be understood and what is required to maintain human well-being over time. It is those questions that form the main focus of this chapter.

Sustainability, well-being and capital

Sustainability in the mainstream economic tradition is understood to be about maintaining levels of well-being over time:

> "Sustainability" therefore implies something about maintaining the level of human well-being so that it might improve but at least never decline (or, not more than temporarily, anyway). Interpreted this way, sustainable development becomes equivalent to some requirement that well-being does not decline through time. (Pearce 1993: 48)

Thus understood the specification of sustainability involves answering at least two prior questions:

- How is well-being to be understood?
- What are the conditions for maintaining well-being over time?

There are standard responses to these questions in the literature. To the first question, the mainstream economics approach specifies well-being in terms of preference satisfaction. Well-being consists in the satisfaction of preferences: the stronger the preference satisfied the

greater the improvement in well-being. For the economist a virtue of this account is that it brings changes in well-being directly under the "measuring rod of money". A person's willingness to pay at the margin for some good is taken to reveal the strength of the preference for the good. The view has its critics, not just among philosophers, but within economics itself, from the revived hedonic account on the one side and from the more objective perspective represented by the capabilities approach on the other. For reasons I outline below, which perspective is taken on well-being makes a difference to an answer to the second question about what is required to maintain well-being over time. The standard answer to this second question runs something as follows: what is required is that "we leave to the future the option or the capacity to be as well off as we are" (Solow 1993a: 181). What is required to leave those in the future this option or capacity is not any particular good or goods but stocks of capital. "Whether these levels of well-being can be sustained over time depends on whether stocks of capital that matter for our lives (natural, physical, human, social) are passed on to future generations" (Stiglitz *et al*. 2009: 11).

The levels of capital required for human well-being should not decline over time, and if possible, they should improve.

On this account, natural environments, resources and beings should be understood as "capital". What is involved in the use of a concept that has its core meaning as commercial assets in this environmental context? At least part of the answer is that it involves an understanding of parts of the natural world as assets that are valued in terms of the services and benefits they provide, either directly for the welfare of those who use them or indirectly as inputs into production and as the background conditions for human life and production. Ayres and Kneese's influential characterization of resources provides a useful starting point:

> Almost all of standard economic theory is in reality concerned with services. Material objects are merely the vehicles which carry some of these services, and they are exchanged because of consumer preferences for the services associated with their use or because they can help to add value in the manufacturing process. (Ayres & Kneese 1969: 284)

Given this view much of the value of the natural world is in terms of the ecosystem services they provide: "the links between nature and the economy are…described using the concept of *ecosystem services*, or flows of value to human societies as a result of the state and quantity

of natural capital" (TEEB 2010: 7). The assets are understood as capacities to "provide humankind with the services of resource provision, waste assimilation, amenity and life support" (Jacobs 1995: 62).

Given this account of sustainability as providing stocks of capital required to maintain and improve human well-being, debates have largely focused on the degree to which different kinds of capital are substitutable for each other. The question of substitutability in recent environmental discussion is Janus-faced. On the one hand, a condition of sustainability is the possibility of widespread substitutability of one set of resources by others with lower environmental impacts: for example of substituting sources of energy with high greenhouse gas emissions, such as coal and oil, with sources that have lower emissions, such as wind power. On the other hand, those concerned with sustaining natural environments and biodiversity want to insist on the limits of substitutability, in particular limits in the degree to which "natural" capital has substitutes in "human-made" capital.

The degree of substitutability of natural and human-made capital is the object of the debates between proponents of "weak" and "strong" sustainability. "Natural capital" is distinguished from human-made capital. Human-made capital is construed widely to include not just particular physical items such as machines, roads and buildings, but also other forms of "capital" such as knowledge, skills, capabilities and social networks. Natural capital is also typically construed widely to include not just particular organic and inorganic physical items, but also other forms such as genetic information and biodiversity. Both human capital and natural capital are understood in terms of the services they provide. The question then becomes one of how far the services provided by natural capital can be substituted by forms of human capital. Proponents of "weak sustainability" are normally taken to claim that a wide degree of substitutability of goods at the margin is possible, so that all that matters for sustainability is that the total level of capital, human-made and natural, does not decline. Proponents of "strong sustainability" are normally taken to claim that there are limits to the substitutability of natural and human-made capital and hence that sustainability requires that there is some level of "natural capital" that does not decline.[1]

Thus outlined it might look as if debate is largely an empirical argument about how far services provided for by one kind of capital do in fact have substitutes of another kind (Ayres 2007). However, the debate does presuppose some resolution of a number of prior conceptual and normative questions that are more philosophical. One concerns how the distinction

between "natural" and "human-made" capital is being drawn in the first place. One way that the distinction might be drawn is terms of the contrast between the natural and artificial (Hume [1739-40] 2000 III.i.ii). One useful starting point for this sense of "natural" is that offered by J. S. Mill as that which "takes place without the agency, or without the voluntary and intentional agency, of man" (Mill 1874: 8).[2] However, as it is used in the literature, the term "natural" is often used in a much looser sense to include many living resources such as managed forests which are not obviously "natural" in this sense. I return to this point later. Before doing so I want to consider two different questions. The first concerns what is meant by saying that one thing is a substitute for another. The second concerns the adequacy of understanding our relation to the natural world in terms of capital that is valued for its services.

The concept of substitutability

What is it for one thing to be a substitute for another?[3] What is it for one thing to be an adequate substitute for another? To answer those questions two concepts of substitutability that are central to this debate need to be distinguished (O'Neill *et al*. 2008: 189).

Technical substitute

One thing is a technical substitute for another if it realizes the same purpose or goal. For example we might say that saccharine substitutes for sugar as a sweetener. Wind power might substitute for coal power as a source of energy. In this sense a particular object serves a substitute if it can perform a similar function in achieving some particular end.

Economic substitute

Welfare economists also, however, use the concept of a substitute in a wider sense with respect to maintaining a particular level of welfare. For any agent, one good, A, is a substitute for another good, B, if replacing B by A does not change the overall level of welfare of that agent. Goods in this sense are not substitutes for another in the sense that they do the same job or perform the same function. Rather goods are substitutes in the sense that, as Hillel Steiner puts it, "although they each do a different job, those two jobs are *just as good* as one another" (Steiner 1994: 171). The concept of economic substitutability allows for a much greater degree of substitutability than does the technical concept. Beer may not be a technical

substitute for sugar as a sweetener in tea. It can be an economic substitute if the beer improves the welfare of the drinker at least as much as the sweetened tea would have done.

Both senses of the term matter for the debates. Much of the empirical debate is concerned with the possibilities for human technologies substituting for natural capital in the sense of being able to provide the same service or perform the same function. For example, faced with a development of a wetland one might ask questions such as: "Are there human technologies that could perform the same waste assimilation functions as this wetland?" or "Are there human-made substitutes that will allow the breeding of this particular species of birds to continue?" where the birds themselves will provide some service, say in terms of agricultural pest control or as objects of delight for bird-watchers. Or at a more global scale, faced with greenhouse gas emissions, the geoengineer might ask if there are human technologies for regulating climate either through the removal of greenhouse gases from the ambient atmosphere or increasing the earth's albedo which could compensate for the damage to the natural systems that provide the service of climate regulation. These services are understood to matter only instrumentally. Technical substitutes are not required if there are economic substitutes. For example, if the loss of birds for the bird-watcher can be substituted for by some other good, say increasing entertainment on television, so that the bird-watcher's overall welfare stays the same, then while technically televisions are not substitutes for the birds provided by wetlands, they might be economic substitutes.

The question of the degree to which goods are substitutable for each other on this account turns on questions both of technical and economic substitutability. However, different accounts of economic substitutability allow for very different levels of substitution. Two things are substitutes for each other in the economic sense if replacing one by the other leaves a person's level of well-being unchanged. What is it to leave a person's level of well-being unchanged? The answer to that question depends on the account of well-being one assumes. Standard neo-classical economics assumes a preference-satisfaction account of well-being. Well-being consists in the satisfaction of preferences: the stronger the preference satisfied the greater the improvement in well-being. If one assumes this view then two alternative goods or bundles of goods x and y are substitutable for each other if they are equally preferred: if x is at least as preferred as y and y is at least as preferred as x. The person is said to be indifferent between them. Given additional assumptions about the structure of preferences – in particular that preferences are transitive (if x is preferred to y and y is preferred to z, then x

is preferred to z), complete (for any two bundles of goods x and y a person either prefers x to y or prefers y to x or is indifferent between them) and continuous (if one bundle of goods x is preferred to another bundle of goods y, then either bundle can be fractionally altered without changing this preference ordering) – then one can draw the continuous indifference curves of economic textbooks which join all the points at which goods are equally preferred. At any point on that curve, its slope indicates the marginal rate of substitution between goods, that is, how much of one good a person is willing to give up in order to gain an improvement in the other.

This account of well-being allows for a wide substitutability of goods for each other. If the bird-watcher comes to prefer watching television to watching birds, then wetlands are replaceable with televisions with respect to that specific function. If consumers come to prefer plastic furniture to wood furniture then some of the "natural capital" embodied in forests can be replaced by human oil-based technologies. Given preferences are mutable enough, the realm of non-substitutable natural capital could, on this account of well-being, turn out to be very small indeed.

If one moves from a preference satisfaction account of well-being to a more objective account, then the extent of substitutability is much more limited. Contrast for example a preference satisfaction account of well-being with a needs-based account. There are standard differences in the logical properties of the concepts of "preference" and "need". First, the concept of need is extensional, whereas the concept of preference is intensional. From "Joseph needs glucose" and "glucose is $C_6H_{12}O_6$", we can infer "Joseph needs $C_6H_{12}O_6$." From "Oedipus prefers to marry Jocasta to any other woman in Thebes" and "Jocasta is Oedipus's mother," one cannot infer "Oedipus prefers to marry his mother to any other woman in Thebes." Whether or not a person needs an object depends on the objective condition of the person and the nature of the object. Specifically, it depends on the capacities of the object to contribute to the flourishing of a person. Whether a person prefers one object to another depends not on the properties of the object as such but rather upon the nature of the person's beliefs about the objects. Second, the concept of a categorical need is a threshold concept, where the concept of a preference is not. Categorical needs are those conditions that are necessary for a flourishing life, such that their absence would harm the person (Wiggins 1998). A person needs a certain amount of water, food and shelter, and also certain social relations, if they are to flourish at all. Categorical needs have lower and upper bounds,

thresholds such that if a person goes below or above them her well-being will suffer. The concept of a preference is not a threshold concept in this sense. It is true that if some preferences for essential goods are not met, a person is harmed, but this is because the preference tracks an essential need. For many preferences, say for first edition postage stamps or bottles of pink champagne, there are no lower bounds such that a person is harmed if they fall below those lower bounds, or for the dedicated collector, for example, upper bounds at which they are satiated.

These differences between needs and preferences have clear implications for how wide economic substitutability is possible. The goods that satisfy one categorical need cannot be replaced by goods that satisfy another need. If a person is dehydrated then she needs water. Good books that satisfy her needs for education or vitamin C that satisfies other nutritional needs are not substitutes. She needs goods that take her above the minimal threshold. More generally any objective state account of well-being which is pluralist in the different dimensions of well-being will involve limits in substitutability across the dimensions of well-being. Consider any standard objective list account of well-being. To live well is to have or realize particular objective states of affairs: particular forms of personal relation, physical health, autonomy, knowledge of the world, aesthetic experience, accomplishment and achievement, sensual pleasures, a well-constituted relation with the non-human world, and so on.[4] There is no reason to assume that goods are substitutable across different dimensions of well-being. It is not the case that for a loss of good under one heading, say bodily health, there is a gain under some other, say personal relations, that leaves the person's well-being unchanged. A loss in one dimension that takes a person below a minimal threshold can only be properly addressed by the provision of goods in that dimension. A person who suffers from malnutrition requires specific objects of nutrition: more entertainment or better housing and education will not do.

Given this objective account, there are limits to economic substitutability of goods across different dimensions of well-being. The question of whether there are substitutes for a good within any dimension becomes a matter of technical substitutability. If a wetland provides a service of waste assimilation that is necessary for the satisfaction of categorical needs, then it only has a substitute if there is a technical substitute for the wetland that provides that service. One cannot replace the services offered by the wetland by another which satisfies another need, say for better education.

In the debates between proponents of weak and strong sustainability, there are then two distinct issues at stake. The first is a conceptual question of how well-being should be characterized and hence how far economic substitution is possible across different dimensions of well-being so that overall levels of well-being are maintained. The second is an empirical question about how far technical substitutes exist for the services provided by one good for another in some dimension of well-being. Proponents of weaker versions of sustainability tend to assume a preference satisfaction account of well-being that allows for a wider degree of economic substitutability and a form of technological optimism that allows for high levels of technical substitutability. Proponents of strong sustainability tend to assume a more objective account of well-being which is more restrictive on the possibility of economic substitutes and are more sceptical about the possibilities for technological substitutes within particular dimensions of well-being.

One thing that should be noted about this dispute is that it is a particular version of a more general debate and is thus not confined to natural capital. If sustainability is understood in terms of maintaining or improving human welfare over generations the dispute can arise across a variety of different dimensions of well-being. Given a pluralist objective account of well-being, sustainability requires each generation to pass on a bundle of goods that maintain welfare across the different dimensions of human life. Sustainability requires the maintenance of the specific conditions and bundles of goods required for livelihood and good health, for social affiliation, for the development of capacities for practical reason, for engaging with the wider natural world and so on. Each dimension will have goods that are specific to that dimension which do not have substitutes in goods that satisfy other dimensions. The capacities of reason require particular formal and informal institutions and goods for their development. The goods of social affiliation require cultural and physical conditions, including particular environments and physical places that are constitutive of good community. The limited economic substitutability of natural and human-made capital becomes a special case of more general limits to economic substitutability.

The concept of “natural capital”

A feature of standard accounts of strong sustainability is that they are concerned only with the limits of substitutability between “natural” and “human-made” capital, and not with limits of substitutability *within* these domains. In particular they still allow for considerable substitutability within natural capital itself. A distinction is sometimes drawn between two

kinds of natural capital: "constant natural capital" includes those elements of natural capital which admit of substitution by other elements of natural capital; "critical natural capital" includes elements which cannot be substituted by other elements of natural capital. Thus, for example, English Nature draws the following distinction between different kinds of biodiversity as follows:

> Those aspects of native biodiversity which cannot be readily replaced, such as ancient woodlands, we call *critical natural capital*. Others, which should not be allowed, in total, to fall below minimum levels, but which could be created elsewhere within the same Natural Area, such as other types of woodland, we refer to as *constant natural assets*. (English Nature 1993)

Strong sustainability on this account involves two distinct tasks: protecting critical natural capital and ensuring that as parts of constant capital are lost to development they are replaced with equivalent parts of natural capital elsewhere. Both kinds of natural capital are still understood as forms of capital – as bundles of assets that provide services. The distinction between the two kinds of capital is an issue of technique. We have a variety of different assets: habitat types, woodlands, heathlands, lowland grasslands, peatlands and species assemblages. Where it is technically and economically possible to re-create this asset within a specified time period it belongs to constant natural capital. Where it is not, the asset belongs to critical natural capital. On this account, if the domain of constant natural capital is large enough, then there is considerable scope of substitution between different components of natural capital.

The possibility for such widespread substitutability within the domain of natural capital underpins a number of recent market-based policies on sustainability. The use of market-based approaches to sustainability has become central to recent global sustainability policy (UNEP 2011). Their defensibility is increasingly a central area of normative disagreement. Consider, for example, the development of biodiversity offsetting as a strategy for achieving sustainability. Biodiversity offsetting introduces into policy for sustaining levels of biodiversity mechanisms that are similar to the carbon-offsetting used in carbon markets. Credits are assigned to landowners who create, restore or enhance a site of biodiversity. Those credits can then be sold to developers to offset losses to biodiversity caused by a development. As a result of these market transactions, the arguments runs, there is no net loss of biodiversity. Constant natural capital is maintained. Different versions of biodiversity

offsetting exist, for example, in New South Wales, Australia and, in the form of wetland mitigation banking, in the United States, and it is becoming increasingly prevalent elsewhere (Kiesecker *et al*. 2009, Madsen *et al*. 2011, UNEP 2011***).

How plausible is the account of substitutability within the domain of natural capital that underpins these market-based approaches to sustainability? One question here is again an empirical one about how far different sites of biodiversity do deliver the same services. An answer to that question will require some account of what those services are. There is a prior question, however, as to whether the value of biodiversity and other aspects of the natural and indeed social world are appropriately understood as "capital". As noted above, at least one implication of the characterization of parts of the natural world as "capital" is that they should be valued as a source of services: "Material objects are merely the vehicles which carry some of these services" (Ayres & Kneese 1969: 284). What are valued are services. Any object as such is valued simply as a "vehicle" for these services. What assumptions are being made in making ecosystem *services* the central object of valuation and denying that objects themselves are the object of value?

An important distinction to be drawn here is between two modes of valuation, *de dicto* and *de re*. Hare offers the following mildly funny joke about Zsa Zsa Gabor to illustrate the distinction:

> **Zsa Zsa:** "Ah! People misunderstand me! They think that I am just a creature of leisure, that I do nothing useful, but they are wrong. I am constantly finding new ways to do good for people."
>
> **Interviewer:** "Like what?"
>
> **Zsa Zsa:** "I have found a way of keeping my husband young and healthy, almost forever."
>
> **Interviewer:** "Eternal youth… that is quite a discovery! How do you do it?"
>
> **Zsa Zsa:** "I get a new one every five years!" (C. Hare 2007: 514)

The joke turns on an ambiguity. In saying she does good, we expect Zsa Zsa to have found a way of keeping the particular person who is her husband young and healthy. It turns out that

Zsa Zsa is simply concerned that whoever turns out to fit the description of being her husband, this person be young and healthy. One initial way of capturing the difference is in terms of the scope of the quantifier in value claims. We expect her to be valuing *de re*, to be valuing a particular object:

∃*x* (x is the husband of ZZG and ZZG values the health of x).

It turns out that she is valuing *de dicto*: she values whoever happens to fall under the description of being her husband:

ZZG values ∃*x* (x is the husband of ZZG and x is healthy).

The distinction allows us to answer the question as to what assumptions are made in taking ecosystem services to be the object of value. To value something only as a vehicle for services presupposes that it should be valued only *de dicto* and not *de re*. It is this assumption that underpins the practice of biodiversity markets and offsets. The practice assumes that policy-makers should only value sites of biodiversity *de dicto*:

P values ∃*x* (x is a site of high biodiversity).

At least part of the reason for opposition to this understanding of sustainability as natural capital is that individuals value sites of biodiversity *de re*:

∃*x* (x is a site of high biodiversity and P values x).

One way of capturing the question about the degree to which substitutability is possible, not just between "natural capital" and "human made capital", but within the sphere of natural capital itself, is in terms of different answers to the question about the extension of the class of objects for which a purely *de dicto* valuation is appropriate. Both sides of the debate between weak and strong sustainability, in using the language of capital and services, assume purely *de dicto* valuations. Objects are valued *de dicto* as vehicles for the provision of services and are substitutable by whatever other object provides similar services. One reason for assuming stronger limits to substitutability lies in the fact that the class of objects to which a *de re* valuation is owed and which are not thus substitutable is wider than either side assumes.

What is the extension of the class of objects for which *de re* valuation is required? What is the class of objects for which *de dicto* valuations are permissible? The answer to those questions turns on whether the object in question is properly valued as a particular, in particular where its history and distinctiveness matters to the valuation. D*e re* valuation is mostly notably required with respect to human persons. Zsa Zsa Gabor isn't finding a "way of doing good for people" by substituting a new person with the required qualities for an old one. Neither do actual wives have Stepford substitutes that perform the same services. We properly value persons as particulars. There are other classes of objects which are similarly valued as particulars. Works of art are valued as particulars with their own history. To value whatever objects have the same properties regardless of history is to value fakes. On the other hand many ordinary fungible objects are appropriately valued in a purely *de dicto* sense. I may, on occasion, value a particular apple *de re* – the first apple picked by my daughter from a tree that we planted together when she was younger. However, most apples are replaceable. I value that there is an apple that satisfies nutritional and gustatory needs, not any particular apple. An apple might be replaceable in turn by some other fruit that satisfies the same needs. One question that underpins debates about sustainability is about the class of objects to which *de re* valuation is required.

Some of the issues involved were raised in the debates on sustainability by one of the main proponents of weak sustainability, Robert Solow:

> It makes perfectly good sense to insist that certain unique and irreplaceable assets should be preserved for their own sake; nearly everyone would feel that way about Yosemite or, for that matter, about the Lincoln Memorial, I imagine. But that sort of situation cannot be universalized: it would be neither possible nor desirable to "leave the world as we found it" in every particular. Most routine natural resources are desirable for what they do, not for what they are. It is their capacity to provide usable goods and services that we value. Once that principle is accepted, we are in the everyday world of substitutions and trade-offs. (Solow 1993b: 168)

Solow allows that where "environmental assets have a claim to intrinsic value", such as Yosemite or the Grand Canyon, then "the calculus of trade-offs does not apply" (*ibid*.: 171). However, he clearly assumes that this class of objects is small, a rare exception:

> The duty imposed by sustainability is to bequeath to posterity not any particular thing – with the sort of rare exception I have mentioned – but rather to endow them with whatever it takes to achieve a standard of living at least as good as our own and to look after their next generation similarly. (*ibid*.: 168)

It is the value of objects as vehicles for services – "for what they do, not for what they are" – that matters for most debates on sustainability. Despite the fact that the concept of sustainability began in discussions of specific resources, and is still so used in many contexts, on this account this is a mistake. Sustainability is not concerned with the conservation of any specific thing.

> [G]oods and services can be substituted for one another. If you don't eat one species of fish you can eat another species of fish. Resources are, to use a favourite word of economists, fungible in a certain sense. They can take the place of each other. That is extremely important because it suggests that we do not owe to the future any particular thing. There is no specific object that the goal of sustainability, the obligation of sustainability, requires us to leave untouched. (Solow 1993a: 181)

While proponents of strong sustainability deny that the services offered by natural capital can be substituted by those provided by human-made capital, both sides in the subsequent debate between weak and strong sustainability follow him in treating "environmental assets" as capital valued for the services they provide and not as particulars. However, there is a prior question as to whether this account is defensible: whether the class of objects valued *de re* is wider than this framing of the debate assumes.

One useful starting point for a case for a much wider extension to the class of objects to which *de re* valuation is owed is to return to a question I left unanswered earlier on, as to how the distinction between "natural" and "human-made capital" is drawn. As I noted then, the concept that looks like it should do the work here is the "natural" as contrasted with the "artificial". The distinction is one that is owed detailed examination, but for the purposes of the argument here I will assume the following provisional characterization of the concept of the artificial: "Something is artificial if and only if it is what it is at least partly as the result of a deliberate or intentional act, usually involving the application of some art or skill" (O'Neill *et al*. 2008: 129). In contrast, something is natural if it is not what it is as the result of a deliberate or intentional act. This characterization captures an important feature of the use of

the term "natural" in this context, that is, that it is a concept that is concerned with the history of an object, with the processes that made it what it is. The point is made well by Goodin:

> According to the distinctively [green theory of value] . . . what it is that makes natural resources valuable is their very naturalness. That is to say, what imparts value to them is not any physical attributes or properties that they might display. Rather, it is the history and process of their creation. What is crucial in making things valuable, on the green theory of value, is the fact they were created by natural processes rather than by artificial human ones. By focusing in this way on the history and process of its creation as the special feature of a naturally occurring property that imparts value, the green theory of value shows itself to be an instantiation of yet another pair of more general theories of value – a *process* based theory of value, on the one hand, and a *history* based theory of value, on the other. (Goodin 1992: 26–7)

An important distinction being drawn here is between end-state accounts of the value of particular environments and historical or process-based accounts of the value of those environments. One way one might value a particular habitat or ecosystem might be simply as an end state, in terms of the assemblage of species it contains. Its historical origins are irrelevant (Attfield 1994: 49). If that is the case, naturalness as such is not a relevant value. This view informs the account of "natural capital" that underpins the distinction between critical and constant natural capital and the forms of substitutability that underpin biodiversity offsetting. If the same assemblages of species variety can be maintained, then the replacement of a natural habitat by a human-created artificial habitat is permissible: overall levels of natural capital are maintained. The term "natural" in the phrase "natural capital" is being used in a loose sense to include any assemblage of living organisms, be this artificial or not. If, on the other hand, the historical processes that created a place matter, then it is that particular that is the object of value. Particular environments will be valued *de re* and not only *de dicto*. As such they will not be replaceable. It is this thought that underpins the defensible kernel of the claim that it is not possible to "fake nature" through human restoration or recreation of a natural environment that has been marred or destroyed: "nature is not replaceable without depreciation of one aspect of its value which has to do with its genesis, its history" (R. Elliot 1982: 87).

This historical account of the value of environments is not however confined to "natural" environments. Similar points apply to the human history that is embodied in particular places.

Place-based values are similarly normally *de re* values of particulars that are rooted in the history that makes a place what it is. The point is indeed implicit in Solow's own examples of monuments such the Lincoln memorial. However, it has much wider application in ordinary places that are valued by those who live within them. Consider the following passage from a person facing eviction to make way for the development of the Narmada dam:

> You tell us to take compensation. What is the state compensating us for? For our land, for our fields, for the trees along our fields. But we don't live only by this. Are you going to compensate us for our forest?… Or are you going to compensate us for our great river – for her fish, her water, for vegetables that grow along her banks, for the joy of living beside her? What is the price of this? … How are you compensating us for fields either – we didn't buy this land; our forefathers cleared it and settled here. What price this land? Our gods, the support of those who are our kin – what price do you have for these? Our adivasi life – what price do you put on it? (Bava Mahalia1994)

There are some services provided by the river which are invoked here: the provision of water and fish, and the watering of soil for growing vegetables. However, what pervades the response are not just services that a river provides, but the loss of a particular place in which the past of a community is embodied and which is constitutive of particular social relations in the present. It is the disintegration of a community and way of life as homes are flooded and people dispersed that matters here. It involves a loss in a basic dimension of human well-being – that of human affiliation and community – which cannot be compensated for by a gain in other dimensions of well-being. Moreover, it is a dimension of well-being that is rooted in a particular place. It is a particular place in which the life of a community is embodied that matters here. The place is valued as a particular and not as a mere vehicle for services.

Similar points apply to more mundane habitats and landscapes which are valued as places. People's relationships are to particular environments that embody their histories, personal and collective. An item that at the level of species assemblage might be easy to replace – a pond or copse of woodland – might have a significance as a particular that no end-state account of its value is able to capture. It is valued as the village pond in which livestock have long been watered and where as a child I caught newts in a net with my father. Livestock might be watered elsewhere and newts, if they are to be caught at all, can be netted in other ponds.

However, it is this particular place with its history and distinctiveness that a person values. Correspondingly, the role that time plays in conservation policy is not simply as a technical constraint on what can be re-created to replace what is lost. Rather, the particular history of a place enters as one source of its value.

In the background here are arguments about the nature of human well-being and the role of environmental goods as conditions for human well-being. The picture offered by standard economic approaches to environmental goods is to conceive of them as bundles of fungible resources that are valued for the provision of services. Sustainability is matter of maintaining a bundle of goods into the future that sustains the options for future generations to realize levels of well-being at least as good as our own. There are two assumptions underlying this picture that should be questioned.

The first assumption, which Solow articulates so clearly, is that particular things and places matter only marginally to human well-being. This claim is false. Relationships to particular persons and places are central components of human well-being. They do not all matter equally. Some things that I value *de re*, say the autographed shirt of some second-rate footballer, may be of marginal value to my well-being. However, many environmental goods that are valued *de re* matter centrally to the well-being of individuals. This is true of the ordinary and everyday places people inhabit and not just of the spectacular or culturally iconic landscapes and monuments. It is why environmental concern with local places is central to so much environmental conflict. It is attachment to particulars that matters to people. Particular places often embody social relations of a community, as in the case of the Narmada, over time. They matter not just as resources that are an external causal condition for the realization of some good, but as conditions for making sense of the life of a person or community. Goodin make a similar point about natural environments: they provide a context in which people can make "some sense and patterns to their lives" (Goodin 1992: 37).

The second assumption is that what we need to pass on to future generations to maintain well-being are simply options or opportunities to satisfy preferences. Some particulars we do not pass on simply as options that will be exercised or not in the satisfaction of whatever set of preferences future people happen to have. It does not make sense, for example, of policies to preserve particular cultural goods such as artworks or books that they are simply providing options for future generations which they may exercise by pulping them for some other ends. The goods are passed on to form preferences and not just as options to satisfy whatever

preferences they might have. Similarly it does not make sense of what moves environmentalists to preserve an old-growth forest that they do so that the next generation has the option to chop it down for expensive chopsticks instead. If one rejects a crude preference satisfaction account of well-being, then improving well-being is about creating the conditions through which preferences for the goods of human life are informed and shaped. Preserving certain particulars, be this in the form of particular parts of nature or particular cultural objects, is often an important part of creating those conditions.

There is an objection to this view that deserves consideration. Brian Barry, after criticizing a purely preference-based account of well-being as a basis for understanding sustainability, considers the alternative "that what should be maintained for future generations is their chance to lead a good life as we conceive it"(Barry 1999: 103). He rejects this proposal for the following reason:

> [O]ne of the defining characteristics of human beings is their ability to form their own conceptions of the good life. It would be presumptuous – and unfair – of use to pre-empt their choices in the future… What this suggests is that the requirement is to provide future generations with the opportunity to live good lives according to their conception of what constitutes a good life. This should surely include their being able to live good lives according to our conception but should leave other options open to them. (*ibid*.: 103–4)

The upshot of Barry's proposal is that we still leave future generations options or opportunities, but these are understood as conditions for a choice of good life rather than simply as the means for preferences. There is something clearly right about what Barry says here. We do not expect any generation to impose only one conception of the good life on all successor generations even if it were possible. However, the alternative Barry suggests is too open. It does not rule out any conception of the good life, and as such looks to be at least as open as the preference-satisfaction model he rejects. It may turn out that their conception of the good life is one in which most trees are plastic.

The alternative to imposing a conception of the good is not to simply leave a set of options. It is rather to understand the relationship between generations to be one of deliberation rather than coercion. There is an ongoing dialogue about the nature of the good life that crosses generations. One expression of these different voices is to be found in the particular goods

they aim to pass to the future. The persons who pass on an old-growth forest do it with the aim of creating the conditions through which the voice of a particular conception of the good life is maintained (cf. Norton 2003a: 439–42) – as do those who pass on particular forms of art or a particular literature. They do so as an expression of a viewpoint in the dialogue, not as the final word. For that reason we pass on not just options but specific goods. To say this is not to say that our understandings of the nature of human well-being will not change or that any conception is final. They will and they should, but they should so as part of a dialogue across and within generations, and not simply through happenstance changes of preferences or through some open menu of possible conceptions of the good life.

None of this is to claim an extreme conservatism, that it is possible and desirable to "leave the world as we found it". It is not possible: the social and natural worlds are always changing in ways beyond human control. It is not desirable: there are often some strong reasons for change. What it does entail is that it is false to claim that replacements are always possible that leave levels of well-being unaltered. There are some losses for which there exist no compensations. Since they are valued as particulars they are irreplaceable without loss. While loss is sometimes unavoidable, it is an occasion for sorrow that cannot be consoled with a compensatory gain elsewhere. If responses owed to such losses are to be appropriate they need to be recognized as such and not as something that can be incorporated into the "calculus of trades and losses". What I hope to have shown in this chapter is that the class of objects for which this is true is much larger than standard economic approaches to sustainability policy assume.

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Bibliography

Attfield, R. 1994. 'Rehabilitating nature and making nature habitable', in *Philosophy and the Natural Environment* eds. R. Attfield and A. Belsey. Cambridge: Cambridge University Press.

Ayres, R. U 2007 'On the practical limits to substitution' *Ecological Economics* 61 pp.115–128

Ayres, R. U. and Kneese, A. V. 1969 'Production, Consumption, and Externalities *The American Economic Review*, 59, pp. 282-297

Barry, B. 1999 'Sustainability and Intergenerational Justice' in A. Dobson ed. *Fairness and Futurity: Essays on Environmental Sustainability and Social Justice* Oxford: Oxford University Press

Bava Mahalia (1994) 'Letter from a Tribal Village' *Lokayan Bulletin* 11.2/3, Sept-Dec

Beckerman, W. 1994. '"Sustainable Development": Is It a Useful Concept?', *Environmental Values* 3: 191-209.

Beckerman, W. (1999) 'Sustainable Development and Our Obligations to Future Generations' in A. Dobson (1999)

Beckerman W. (2000) 'Review of J. Foster ed. *Valuing Nature? Ethics, Economics and the Environment' Environmental Values* 9, pp.122-124

Daly, H. E. 1995. 'On Wilfred Beckerman's critique of sustainable development', *Environmental Values* 4, 1: 49-55.

Dasgupta, P. 2001 *Human Well-Being and the Natural Environment* Oxford University Press

Dasgupta, P. 2005 'Three Conceptions of Intergenerational Justice' in H. Lillehammer and D.H. Mellor, eds., *Ramsey's Legacy* Oxford: Clarendon Press.

Dobson A. 1996 'Environmental Sustainabilities: An Analysis and a Typology' *Environmental Politics*, 5, pp.401-428

Easterlin, R. 1995. 'Will Raising the Incomes of All Increase the Happiness of All?' *Journal of Economic Behaviour and Organization*, 27, pp. 35–48

Elliot, R. 1982 'Faking Nature', *Inquiry* 25, pp. 81-93

English Nature. 1993. *Position Statement on Sustainable Development* English Nature, Peterborough.

Goodin, R. 1992. *Green Political Theory* Cambridge: Polity Press.

Hare, C. 2007 'Voices from Another World: Must We Respect the Interests of People Who Do Not, and Will Never, Exist?' *Ethics,* 117, pp. 498-523

Holland, A. 1997. 'Substitutability: or, why strong sustainability is weak and absurdly strong

sustainability is not absurd' in J. Foster ed. *Valuing Nature* London: Routledge.

Hume, D. (1978) [1739] *A Treatise of Human Nature* Oxford: Oxford University Press

Jacobs, M., 1995. 'Sustainable development, capital substitution and economic humility: a response to Beckerman', *Environmental Values* 4, 1: 57-68

Kiesecker J., Copeland, H. Pocewicz, A. Nibbelink, N. Mckenney, B. Dahlke, J. Holloran M. Stroud, D. 2009 'A Framework for Implementing Biodiversity Offsets' *Bioscience* 59, pp.77-84

Madsen, B., Carroll, N., Kandy, D. and Bennett, G. 2011 *State of Biodiversity Markets. Washington, DC: Forest Trends, 2011*.
http://www. ecosystemmarketplace.com/reports/2011_update_sbdm

Mill, J. S. 1874 'Nature', in *Three Essays on Religion* London: Longmans

Moore, G. E. 1903. *Principia Ethica*. Cambridge: Cambridge University Press.

Norton, B, 2003 *Searching for Sustainability* Cambridge: Cambridge University Press

Nussbaum, M. 2000 *Women and Human Development: The Capabilities Approach* Cambridge: Cambridge University Press

O'Neill J., Holland, A. and Light, A. 2008 *Environmental Values* London: Routledge

O'Neill, J. 2008a *Markets, Deliberation and Environment* London: Routledge

O'Neill, J. 2008b 'Sustainability, Well-being and Consumption' K. Soper and F. Trentmann eds. *Citizenship and Consumption* London: Palgrave

Pearce, D. 1993 *Economic Values and the Natural World* London: Earthscan

Ramsey, F. 1928, A Mathematical Theory of Saving, *Economic Journal* 38 pp. 543–559

Solow, R. M. 1993a 'Sustainability: An Economist's Perspective; in N. Dorfman and R. Dorfman eds. *Economics of the Environment: Selected Writings* New York: Norton

Solow, R. M. 1993b 'An Almost Practical Step toward Sustainability' Resources *Policy* 19 pp. 162-172

Steiner, H. 1994 *An Essay on Rights* Blackwell: Oxford

Stern, N. 2006 *The Economics of Climate Change* Cambridge: Cambridge University Press

Stiglitz, J., Sen, A. and Fitoussi, J. 2009 *Report by the Commission on the Measurement of Economic Performance and Social Progress* http://www.stiglitz-sen-fitoussi.fr/documents/rapport_anglais.pdf

TEEB 2010 *The Economics of Ecosystems and Biodiversity: Mainstreaming the Economics of Nature: A synthesis of the approach, conclusions and recommendations of TEEB.* http://www.teebweb.org/TEEBSynthesisReport/tabid/29410/Default.aspx

UNEP, 2011, *Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication*
www.unep.org/greeneconomy

Wiggins, D. 1998 'The Claims of Need' in *Needs, Values, Truth* 3rd edition Oxford: Blackwell

World Commission on Environment and Development 1987 *Our Common Future* London: Oxford University Press

[1]. For discussions see Beckerman (1994, 1999, 2000), Daley (1995), Jacobs (1995), Dobson (1996a), Holland (1997).

[2]. For a discussion of different senses of nature see J. O'Neill *et al*. (2008, ch. 8).

[3]. For a related discussion of this issue see Holland (1997) and J. O'Neill (2008, ch.1).

[4]. See for example that in Nussbaum (2000).