

Rachel Carson, Wonder and Environmental Education

Rachel Carson, maravilha e educação ambiental

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Abstract

Rachel Carson (1907-1964) became famous for her book “Silent Spring”, published in 1962. This book explained how the use of herbicides and pesticides like DDT in the northern hemisphere was causing a build-up of DDT in the flesh of penguins in the Antarctic, and that governments and corporations everywhere should exercise restraint in their use of technology to avoid unintended impacts on the world’s ecological systems. When she wrote this book, Carson had terminal cancer, and decided to go ahead and complete this crucial book, rather than to write a book on the wonder of the natural world and how to instil a sense of it in children. But in 1965 she did publish a short book, “The Sense of Wonder”, which includes as a chapter her earlier essay ‘Help your child to wonder’, about revealing to a child the mysteries to be found at the edge of the sea. So Rachel Carson’s contribution to environmental protection, in addition to her works about marine ecology and her disclosure of the dangers of herbicides and pesticides, included also her practice and advocacy of environmental education. This perspective is still relevant today.

Keywords: *Rachel Carson. Wonder. Environmental Education.*

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Resumo

Rachel Carson (1907-1964) ficou famosa por seu livro *Silent Spring* (Primavera Silenciosa), publicado em 1962. Este livro explica como o uso de herbicidas e pesticidas como o DDT (diclorodifeniltricloroetano) no hemisfério norte estava causando um acúmulo de DDT na carne dos pinguins na Antártida, e que os governos e as empresas por toda parte deveriam exercer restrição no seu uso da tecnologia para evitar impactos não intencionais nos sistemas ecológicos do mundo. Quando ela escreveu este livro, Carson estava com câncer terminal e decidiu seguir em frente e concluir este livro crucial, em vez de escrever um livro sobre a maravilha do mundo natural e como inculcar um senso disso nas crianças. Mas em 1965 ela publicou um pequeno livro, *The Sense of Wonder* (O senso de maravilha), que inclui como capítulo seu ensaio anterior "Help your child to wonder" (Ajude seu filho a se maravilhar), sobre revelar para uma criança os mistérios que podem ser encontrados à beira do mar. Assim, a contribuição de Rachel Carson para a preservação ambiental, além de suas obras sobre ecologia marinha e de sua divulgação dos perigos dos herbicidas e pesticidas, incluiu também sua prática e defesa da educação ambiental. Essa perspectiva ainda é relevante hoje.

Palavras-chave: Rachel Carson. Maravilha. Educação ambiental.

Introduction

I begin with Rachel Carson, who became famous for her book *Silent Spring* (1962). This book explained how the use of herbicides and pesticides like DDT in the northern hemisphere was causing a build-up of DDT in the flesh of penguins in the Antarctic, and that governments and corporations everywhere should exercise restraint in their use of technology to avoid unintended impacts on the world's ecological systems. When she wrote this book, Carson had terminal cancer, and decided to go ahead and complete this crucial book, rather than to write a book on the wonder of the natural world and how to instill a sense of it in children. But she did publish a short book, *The Sense of Wonder* (1965), which includes as a chapter her earlier essay 'Help your child to wonder', about revealing to a child the mysteries to be found at the edge of the sea. These included the sight of ghost-crabs on the shore and of moonlight illuminating the waves as night fell.

Carson and Moore

So Rachel Carson's contribution to the world, in addition to her trilogy about marine ecology and her disclosure of the dangers of herbicides and pesticides, included also her practice and advocacy of environmental education. In Carson's case, this meant walks along the New England coast together with her small nephew, as they laughed for pure joy, sharing the "spine-tingling response to the vast roaring ocean and the wild night around us" (Carson, 1965, p. 15; Moore, 2005, p. 267).

According to Carson and Moore, wonder begins with surprise; and the natural world often evokes such surprise by its beauty. René Descartes defined "wonder" as "a sudden surprise of the soul", and Carson called the sense of wonder an emotion (Moore, 2005, p. 267). Given a sense of wonder, we marvel at a tree or a bird as if we were seeing it for the first time (Moore, 2005, p. 269). Learning their names helps, but is not necessary. But it may be better to understand wonder as an attitude, to which we become attuned by such discoveries. Once our eyes are opened to nature's surprises, we become readier to notice them and respond to their unexpected appearance anywhere and potentially everywhere. An example is the amazing flight of the bats who fly over my local stream in late evenings in summer.

Yet some amount of scientific education helps people understand the natural world, and how it comes to be as it is. Experience suggests that it also helps with gardening; gardeners need, for example, to understand the root structure both of the plants they are planting, and of the weeds they are trying to remove. Carson found barnacles much more remarkable after coming to realise how in their early lives they float free in the ocean, and later cement themselves to promising inter-tidal rocks, where they can wave their legs in the ocean current and catch their food, pulling their legs back and shutting their shells when the tide recedes (Moore, 2005, p. 265). Here we leave Carson for the present, but I should first mention that the article of Kathleen Deane Moore, entitled 'The Truth of the Barnacles: Rachel Carson and the Moral Significance of Wonder', published in the 2005 volume of *Environmental Ethics*, repays attention, and serves as an eye-opener to Carson as well as to wonder.

Scientific Education and the Value of Natural Creatures

Some have suggested that learning scientific explanations might undermine the sense of wonder, because objects or scenes or places of wonder may lose their mystery, once understood. But, as Hepburn has

replied, this is not normally the case. While we may be less amazed by the tricks of conjurors once we understand their slight of hand, phenomena like Carson's barnacles, or like migrations of monarch butterflies, or like the *aurora borealis* (the northern lights) or the *aurora australis* (the southern lights) become no less wonderful when we grasp their relation to nature's regular processes. On the contrary, scientific understanding often enhances our admiration of, amazement at and bewitchment by these same phenomena (Hepburn, 1984).

Scientific education can thus greatly assist with nature appreciation (not least on the part of children), whether the area of study is intertidal life, woodlands, the pollinating behaviour of bees or the predatory life of spiders. As we shall see, it is important for understanding much else besides, such as the global challenges of climate change and of biodiversity loss, by which we are all affected, and by which children are prone to be affected more than the rest of us, granted that the life-expectancy of many of them stretches into the next century. I am including under 'scientific education' botany, zoology, geology and ecology too. Ecology is the scientific study of ecosystems and habitats, and of how they form, change, and are best protected. Huge progress has been made in this field since its nineteenth-century origins, and some of its rudiments should occupy a key place in the curricula of our schools.

At the same time as studying the natural world and its interconnectedness, we can hardly help acquiring a sense of its value. In part, this consists in its aesthetic value, the value that stirs our emotions and our sense of wonder. In part, this consists in its historic value, which we come to recognise when we discover the millions of years over which natural systems have evolved, how remarkable their survival has been, and how vulnerable many of them remain. In part it also consists in the intrinsic value of the flourishing of these creatures. Intrinsic value, in the understanding of many philosophers, involves the grounds or reasons that its bearers offer, just as such, for being protected and preserved; and the importance of such preservation is another of the lessons that environmental education can impart.

Environmental Education in Brazil and in Britain

Yet the ecosystems that are candidates for preservation are extremely diverse, and both children and their elders need to learn not only about the local ecosystems, but also about the others of their country. Thus in Brazil there are different ecosystems in the Amazon rainforest, in the high Andes, in the Mato Grosso, in the Pantanal and along the Atlantic coast, while many city-dwellers probably have little awareness of most if not all of these ecosystems. But as potential voters, children need to be aware of all these systems, and what is at stake when their governance is under consideration.

Very much the same is true of my own country, the United Kingdom. We too have forests, in the form of temperate ancient woodlands, but far too few, as a result of deforestation over the last few centuries. We have mountains, but not on the scale of those of Brazil. Ours are often used for the pasturing of sheep, except those that are too barren. As they are mostly situated in the north and the west of the country, many Britons (particularly those who live in the south and east) have little awareness of them. We have rolling hills, used continuously for farming for many centuries, but with far too few hedgerows, which used to provide homes for native birds, flowers and insects, but which have been removed on a large scale ever since the industrial and agricultural revolutions of the eighteenth century. We have rivers, but despite efforts to preserve their ecosystems, they are one and all polluted. We also have wetlands, such as the Fens of eastern England,

and the Somerset Levels of western England, which are different from the Pantanal in that they stay wet throughout the year. Yet like the Pantanal they often threaten their human inhabitants with flooding.

These features of the United Kingdom have (or should have) an important place when British children study the geography of Britain. But it is far more important for children in Brazil to study the geography of Brazil and of the rest of South America. This is partly because of the impacts that Brazil, as the largest country in South America, can have on the future of the continent and its ecosystems, and partly too because of the impact that these ecosystems are likely to have on neighbouring countries and on the rest of our planet.

The World-Wide Importance of the Amazon Rain-Forest

The impacts of possible changes affecting the Amazon rainforest system in particular are increasingly well-known, but are worth repeating here. There is a danger that the continuing deforestation of this rainforest, as it is cleared for roads, settlements, agriculture and mining, will make it morph overall into savannah (like the savannah of East Africa), a dryer kind of grassland ecosystem. The transition would have far-reaching impacts on the climate and weather systems of the planet. This process also threatens the indigenous peoples living in the Amazon forest, who are often skilful in making a living from its resources and in preserving it. The Amazon forest, while it remains, plays a crucial role in stabilising the other major regions and systems of the planet, like the Indian monsoons, the Pacific weather systems of El Niño and La Niña, and even the ice-fields of Greenland, the Arctic Ocean and of Antarctica; and there is a risk that if we reach the tipping-point where it could become a savannah rather than a rain-forest, this might lead to a sequence of other tipping-points being reached elsewhere on Earth, with widespread detrimental effects (Lenton, 2011; Lenton et al., 2019; Cho, 2021; Caldecott, 2022).

Brazil is not, of course, solely responsible for preserving the Amazon rain-forest. Several parts of this forest region are to be found in other countries, such as Bolivia, Peru, Ecuador, Colombia and Venezuela, which all need to play their part. However, Brazil is an economic giant, probably exceeding the economic power of all these other countries put together, and may be in a position to co-ordinate preservation efforts on a regional basis. Nor is Brazil the only country in South America in a position to make a huge difference to the future of the planet, for Argentina needs to safeguard (rather than mine) its reserves of natural gas, and to keep the huge quantities of methane that are currently buried in Patagonia safely stored in the ground. Besides, the world's stronger economies in Europe, North America and East Asia could reasonably be expected to contribute to these climate-preserving projects, since their well-being is very much at stake as well.

All this significantly adds to the value of the Amazon rain-forest and of its preservation. Besides its aesthetic and intrinsic value, its instrumental value is vast, both for the future of humanity, and also for the future of the many species that inhabit it, and those other many species that live elsewhere, but would be affected by its downfall.

Brazil is not, of course, the only country with significant ecological resources that are at risk and in need of preservation. Many Asian and African countries are in comparable positions. Nor is Brazil the only country with ecological problems that are in need of urgent attention. For example, the United Kingdom (as described above) is another, and so are the United States, Canada, Japan and many other countries. However, the future of Brazil is importantly in the hands of Brazilian voters and of no others, and this is a further reason for the importance of educating future Brazilian voters in the schools and Universities of Brazil.

Conclusions: Back to Environmental Education and to Wonder

This brings us back to environmental education, but adds to the overall context in which it needs to be presented. For in addition to the science of forest ecosystems and of watersheds, and of the hydrological cycle, young people need to learn about global warming, about greenhouse gases, about temperature trends, about sea-level rise and about the impacts of higher levels of carbon dioxide and other gases in the atmosphere, in the forms of increased storms, droughts, wildfires and famines. They need also to learn about international relations and international agreements, as well as about climate systems and their tipping-points.

All this means that ecological systems and crises need to be explained in an inter-disciplinary way. For while physics, chemistry, biology and geology are relevant, so too are history, geography, social studies and the stances of all the great religions on the issues that have been discussed. There is, of course, a wide case for everyone to be educated in these and in further disciplines in any case; but the topics mentioned earlier suffice to show the need for very broad systems of education, delivered in a joined-up manner, if young people are to understand the issues which, as citizens, they are going to have to confront.

Yet there is a danger that education of these kinds could fail to engage or excite the students, or to allow them to develop as rounded people. Education at all levels needs to include themes that, as well as informing and developing understanding, nourish the imagination and the emotions, not least through the study of languages and literature. But imagination and engagement are also likely to be fostered through the kind of up-bringing advocated by Rachel Carson, with which we began. In particular, education that neglects the fostering of wonder risks supplying vital information at the cost of students becoming either anxious or apathetic, rather than well-rounded and engaged.

Carson's approach suggests that outdoor education should have a prominent position within environmental education, and that if possible there should be opportunities for one-to-one teaching about, for example, the life-histories of plants, birds, mammals and insects. This is one of the likelier routes to inculcating a sense of wonder; and, as Carson held, wonder at the natural world often leads to respect and a sense that 'this should continue'. Besides, teaching about ecological science and natural history discloses creatures and systems that evolved independently of human goals and purposes, and grasping this can lead to a sense of their aesthetic value and their worth, and thus the importance of preservation, both for the creatures' own sake and for that of humanity (see Moore, 2005, p. 273). It is not only the education of our children that is at stake, but the well-being of our children's children, and of the world that they will inherit, as well.

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