



# DARWIN'S BRAVE NEW WORLD

**TEACHERS NOTES**



SCREEN  
AUSTRALIA



# DARWIN'S BRAVE NEW WORLD

## Series synopsis

*Darwin's Brave New World* is the story of how four young voyagers to the Southern Hemisphere changed our world, forever. The epic adventures of Charles Darwin, Joseph Hooker, Thomas Huxley and Alfred Russel Wallace revolutionised science, turned society on its head and gave birth to an extraordinary theory about the evolution of life on earth.

In this brilliant three-part dramatised series, we take a fresh look at Charles Darwin's oft-overlooked experiences in New Zealand, Australia and the Cocos & Keeling Islands and discover that these extraordinary places were crucial in formulating his radical theory of evolution.

Australasia was also critical in forging the lives and careers of Darwin's greatest allies: Joseph Hooker, Thomas Huxley and Alfred Russel Wallace. These three men would support and defend Charles Darwin through years of illness, isolation, agonising self-doubt and religious crisis. Without their courage and tenacity, Darwin may never have published *On the Origin of Species* – his great work about evolution and a book that changed the way we understand our world and our place in it.

## Curriculum links

Curriculum links include Science, Ecology, Environmental Studies, Psychology, Personal Development, History, SOSE/HSIE, Studies of Religion, Philosophy, English and Media Studies.

## List of commentators

|                           |  |
|---------------------------|--|
| Professor Iain McCalman   | Historian, University of Sydney            |
| Professor Richard Dawkins | Evolutionary Biologist, Oxford University  |
| Professor Mick Clout      | Biologist, Auckland University             |
| Ove Hoegh-Guldberg        | Coral Biologist, University of Queensland  |
| Professor Janet Browne    | Historian, Harvard University              |
| Professor James Moore     | Historian, The Open University             |
| Professor Mike Archer     | Palaeontologist, University of NSW         |
| Professor Jerry Coyne     | Biologist, University of Chicago           |
| Professor Jared Diamond   | Geologist, University of California        |
| Professor David Suzuki    | Geneticist, University of British Columbia |
| Professor Toby Bradshaw   | University of Washington                   |
| Professor Michael Ruse    | Philosopher, Florida State University      |
| Stephen Hopper            | Director, Royal Botanic Gardens, Kew       |

# DARWIN'S BRAVE NEW WORLD

## Episode 1: Origins

### Episode synopsis

When 21-year-old Charles Darwin embarks on a five-year voyage to the Southern Hemisphere, it transforms him from a dilettante into a revolutionary and groundbreaking scientist.

On the last and often-ignored leg of his voyage to New Zealand and Australia, Darwin goes further than ever before towards his radical theory of evolution: he witnesses the deadly competition between European settlers and the indigenous peoples, between the native animals and introduced species; in the coral islands of Cocos and Keeling off the Western Australian coast he discovers a world created through a struggle for survival, giving him an incredible insight into how life evolves. On his return to England in 1836, Darwin's dangerous idea grows into an obsession. If life did evolve by natural means, where did that leave God? What about humans? Are we just another sort of ape?

Darwin knew that if he ever went public with these incendiary ideas, the religious and scientific establishment would destroy him. But this ambitious 27-year-old can't leave the idea alone. On the verge of dying from a mysterious disease, Darwin confides his work to two people: his devout wife, Emma, and a young botanist called Joseph Hooker who, like Darwin, has just returned from a voyage to the Southern Hemisphere.

### History of theories about evolution

Before we look in detail at Charles Darwin's life work and struggles, and the significance of his relationships with his family and scientific colleagues, as presented throughout *Darwin's Brave New World*, we should first acknowledge that Darwin was not working in a vacuum, removed from the history of all scientific thought and progress not only preceding his own research and theories, but being pursued by his contemporaries. (See 'History of evolutionary theory' in website references.)

- Write a brief account of the history of research, experimentation and theorising into the evolution of living species in the 18th and early 19th centuries. You may wish to carry this out on display paper as an annotated timeline.
- Either create an illustrated poster display or a formatted magazine page about the evolution theories of one of the following, showing both the advancements in thought of their views, and the ways in which their arguments have either been superseded, revised, or proven incorrect in later times:
  - Erasmus Darwin (grandfather of Charles Darwin)
  - Jean-Baptiste Lamarck
  - George Cuvier
  - Charles Lyell

### Voyages of HMS *Beagle*

HMS *Beagle* is primarily famous today for Charles Darwin's world journey of discovery, 1831-1836, which inevitably led to the formation of his views on the evolution of living species via the process of natural selection. This was the second of the *Beagle's* scientific expeditions, and in fact the *Beagle* undertook three of these missions. (See 'HMS *Beagle*' in website references.)

- On a world map, indicate the route of each of the three *Beagle* journeys, and the years in which those journeys took place.
- To accompany the map, illustrate a picture of the *Beagle*, indicating its physical dimensions and mass tonnage. How many people sailed on it at any one time (crew, officers and others)? How seaworthy was it? Was it fitted out for comfort? What scientific equipment did it carry?
- Carry out research then discuss in class and write your own appraisal of the reasons for, and the long-term importance of, the three world journeys of HMS *Beagle*.
- Some of the men who were sailing with Darwin on the *Beagle's* second voyage also went on to achieve historical notice. Research then write short, selective biographies of the following:
  - Captain Robert FitzRoy
  - Conrad Martens
  - Syms Covington
  - Philip Gidley King
  - John Lort Stokes
- Write a short fiction story told from the point of view of a crew member on the *Beagle's* second voyage. This could be presented in 'traditional' narrative story format, or as diary entries, or as letters between the crew member and a loved one at home.

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## Formative influences on Darwin's concept of 'natural selection'

From Episode One of the series, we see that Darwin's journey on board the *Beagle* to South America, the Galapagos Islands, New Zealand, Australia and on to the Cocos and Keeling Islands was extremely important in his later development of the concept of 'natural selection' as the cause by which living species evolve.

- On his voyage through the Pacific, Darwin encountered islands and island continents that Professor Iain McCalman refers to as 'containable', and as 'a kind of perfect laboratory'. Discuss in class and write notes on what you think he means by these comments, in reference to the plant and animal species that exist in these environments, and the indigenous human societies that are long-settled there.
- From the program discuss Darwin's observations of the changes wrought upon indigenous plant, animal, and human existence caused by the relatively recent introduction into the environment of British colonialism. In what ways could these observations play upon the development of a concept of natural selection? If a species of plant or animal is introduced into an environment where there is no natural enemy of that species already present, what is likely to happen? Provide at least one example of an introduced or 'invasive' species into New Zealand, discussed in Episode One, and the effects of its introduction.
- Write a commentary on Darwin's observations of the effect of European (British) colonialism on the Aborigines of New South Wales, and how this might be incorporated into a theory of natural selection.
- Discuss how Darwin's observations of Australian animals, particularly the platypus, confronted the prevailing British scientific views of the time about God's creation of species. How might his reaction to seeing a platypus, a creature similar to European water rats, lead to a theory of the evolution of one species from a previous, different species over time, environmental changes, and space?
- Discuss the ways in which introduced species such as cats, rabbits, foxes, pigs and camels thrive as feral species in the Australian natural environment, and the effect they have had on

indigenous fauna and flora species. Refer to the Darwinian concepts of natural selection and survival of the fittest in your response.

- Explain why Darwin's exploration of coral reefs in the Cocos and Keeling Islands indicated to him an alternative 'evolutionary' explanation to that of sudden biblical creation as to how the Earth's surface was formed.

## Return to England: Anglican academia, research, love and trust

We are informed in Episode One that when Darwin arrived back in England in 1836, the country was undergoing great change – although some things remained the same.

- Explain the close relationship in England between the power of the Anglican clergy and the academic study of science in universities, particularly of geology and the natural sciences – those areas in which Charles Darwin was now taking a major interest. In what ways were his theorising about evolution and natural selection 'dangerous ideas'? Why was it, in the words of Professor James Moore, 'a bad career move' for Darwin to speak publicly on the subject?
- Write an explanation of how Darwin might have been influenced by the theories of political economist Thomas Malthus. (See 'Thomas Malthus' in website references.)
- Professor Mike Archer refers to the armadillo Darwin observed in South America, which Darwin compared to ancient fossils of a similar creature. Discuss what Archer means when speaking of a 'vertical relationship' between fossil and contemporary species, and how this could not fit with the 'biblical model' of species assumed by Darwin's own teachers to be self-evident.
- Following from the previous activity, plan and create an illustrated page, or double-page spread, for a magazine aimed at children or young teenagers, about the 'vertical' connection between armadillo-like fossils, present-day species and Darwin's theories. Consider text, layout and use of colour and illustration in making the production informative and interesting.
- Discuss the importance of Darwin's work, undertaken with ornithologist John Gould, on the study of finches taken from the Galapagos Islands. What did this study demonstrate about

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the ways in which new species might evolve from previous species?

- Write a short selective biography of John Gould's life and career. Ensure you provide information about his connection to Australia, and his relevance to us today. An alternative to a written biography may be to design and present an illustrated display poster. (See 'John Gould' in website references.)
- Discuss the importance of the relationship and 'sacred trust' between Darwin and his wife, Emma. As though you were Emma, write a set of personal diary entries about this. Remember that, as with other upper-middle class English citizens of the era, she is a devout Christian, raised to believe that Man and Woman were created in God's likeness. Take into account your feelings about this in relation to the theories being developed by your husband.
- Imagine you are someone like Darwin, compelled to remain quiet about your scientific research in developing a theory of evolution of all species, yet secretly writing notebooks about it. Write a letter to a trusted friend in which you express your deepest feelings, responsibilities, concerns and fears about the predicament you are in, and what it might mean not only to you, but to your wife, family and friends if your activities and ideas were exposed.
- Explain what Darwin and Joseph Hooker had in common with each other in life experience, professional interests and career when Darwin first wrote to him in 1843. Why did Darwin wish to collaborate with Hooker on his research into the origins of species?

## Episode 2: Evolutions

### Episode synopsis

Darwin turns his back on scientific celebrity and becomes a virtual recluse, secretly gathering evidence for his theory of evolution. He is almost trumped by a rival book on evolution but finds a steadfast supporter in the young botanist, Joseph Hooker.

Darwin's faith is shattered by the death of his beloved daughter Annie but he is buoyed up by the return from Australasia of one of his greatest allies: the young firebrand, Thomas Huxley.

Darwin knows he has found the men he needs to help him when he goes public with his ideas. Hooker and Huxley push Darwin to publish but events overtake everyone when a letter arrives from Indonesia. An obscure collector called Alfred Russel Wallace has come up with an evolutionary theory almost identical to Darwin's own. Darwin is shattered and fears that 20 years of work has come to nothing.

### 'Vestiges'

While Darwin was secretly working on his theories of the evolution of species, a 'popular science' book, also about evolution, was published by an anonymous author in 1844. Despite being panned by the religious-scientific establishment, it was a best-seller, and a sequel was published in 1845. Even Queen Victoria was reputed to have had it read to her by husband, Prince Albert! (See 'Vestiges' in website references.)

- As a general background to the times, research, discuss in class and write a short account of the Chartist movement gathering force in England. (See 'Chartism' in website references.)
- Carry out appropriate research then write an account of the main thesis of *The Vestiges of the Natural History of Creation*. Who was the author, and why was the book published anonymously? Describe, in general, the essential differences in argument between *Vestiges* and Darwin's research findings.
- As presented in Episode Two, Darwin's former professor at Cambridge University, Adam Sedgewick, referred to *Vestiges* as 'irreverent nonsense'. Joseph Hooker, from a different angle, told Darwin the book was 'a nine-day wonder'. First, find out more about their views on *Vestiges*, and also the views of others, including social and political reformers. Drawing on your knowledge, write a letter to a newspaper of the day, in which you present your own reaction to the publication of *Vestiges*. You may present it from any appropriate viewpoint, although you should attempt to be rational and logical in opinion.
- After the publication of *Vestiges*, discuss why Hooker advised Darwin to concentrate his private research on specialising in a study of only one species of animal. What was the species Darwin chose, and why? In brief, what were the results of his research? Why did he remain publicly silent about his findings?

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## Death of Annie

While developing his theories on natural selection, Darwin's young daughter, Annie, fell ill and died in 1851.

- As we have seen in the program, when Annie died Darwin struggled with the commonly accepted Christian belief that any human death, in this case his own daughter's, was attributable to, and explained by, God's will. From the program discuss in class the view that 'tragedy' and 'cruelty' are necessarily inbuilt characteristics of Darwin's 'vision' of natural selection, and that Annie's death must be interpreted in this light, as part of the struggle for existence in nature, and not in any other way.
- Referring to Darwin, Professor Richard Dawkins suggests that Annie's death 'was part of what killed religion for him'. Discuss what you think Dawkins means. Plan and write a short fiction story drawing on this theme.

## 'Bond of the salt'

Together Joseph Hooker, then Thomas Huxley and Alfred Russel Wallace, formed a group of scientific colleagues and friends involved in the publication and public defence of Charles Darwin's *On the Origin of Species*. (See website references on Hooker, Huxley and Wallace. Note that the writers of the first of the Wallace websites set out to 'debunk some of the many myths surrounding Wallace and Darwin'. You may wish to research the accuracy of this.)

- Explain the biographical similarities between Darwin, Hooker, Huxley and later Wallace, and how they were 'bonded' by salt.
- Design and create a display poster with text and illustration, titled Charles Darwin's Friends of the Salt.
- Explain Professor Mike Ruse's comment that 'Huxley to Darwin is as St Paul was to Jesus'. In terms of the subject of the program, what is ironic about this comparison?
- Why was Darwin initially horrified when Wallace wrote to him about his own discoveries about natural selection? In what sense was it the trigger for Darwin to come to a major decision about the fate of his own studies?

## Experimentation and testing

Episode Two shows a variety of seemingly simple experiments with flora and fauna Darwin carried out in researching his theories.

- Define in class and offer your own examples of deductive and inductive reasoning. Explain whether Darwin's general theory of the evolution of species, as arising from his experimentation, was a result of deductive or inductive thinking.
- Explain why Darwin placed plant seeds in salty water, and what this was intended to demonstrate about the spread and evolution of species. What did this experiment have in common with his tests on snails, and pouring flour on bees? Consider whether the data arising from such experiments could be conclusive evidence of something, or whether the testing and therefore the data and results might be flawed.
- As a class, carry out the 'jelly bean' test of natural selection to determine which ones are likely to survive selection, and which are not. After completing the test, examine the results then attempt to explain them. (See instructions for 'Jelly bean test' in website references. Note that the class teacher should examine this website first, then arrange the test. An explanation of the likely results of the test is provided on the website.)
- Darwin predicted a particular species of bird would be discovered that would pollinate a specially-shaped orchid in Madagascar. What type of bird did he suggest, and why?

## Episode 3: Publish and Be Damned

### Episode synopsis

After labouring in secret for 20 years, Charles Darwin is almost trumped by the obscure young naturalist, Alfred Russel Wallace, who has been in the southern world of Australasia for almost a decade.

Shocked that someone else is drawing the same conclusions, Darwin knows that he must publish his own work post haste. Hooker helps to ensure that Darwin has priority over Wallace by arranging a joint reading of their theories, while Huxley sharpens his beak and claws in readiness to defend Darwin against the Church and scientific establishment.

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Wallace returns to England and immediately joins battle in defence of Darwin. *On the Origin of Species* is published to acclaim and attack and Darwin's allies embark on a bitter and brutal public battle for Darwin's idea and the future of science.

The battle culminates with the legendary Oxford debate in which Hooker and Huxley go toe-to-toe with the reactionary forces of Church and the scientific establishment. Charles Darwin and his theory of evolution eventually triumph.

## Ethics in science, prior rights and ownership

When Darwin realised Wallace's as-yet unpublished theories were almost identical to his own, it opened a can of worms as to how to handle the situation, particularly as Wallace was on the other side of the world, and not in control of being the first to publish.

- From the program, and from any further research you have done, in class discussion construct the line of reasoning and argument taken by Hooker, Huxley and Darwin's mentor, Sir Charles Lyell, to justify not publishing Wallace's theories of natural selection before Darwin himself was ready to publish his own. What was the purpose and the accepted outcome, in scientific circles, of being the first to publish new research findings? How was it possible for Darwin to 'establish priority' of ownership over Wallace, of a set of theories that were almost identical to each other? How was the matter finally resolved?
- Following from the previous activity, discuss whether Darwin's colleagues and friends, here, acted honourably and ethically, especially in view of the fact that Wallace was in South-East Asia at the time, and had no idea of what Hooker, Huxley and Lyell were planning to do. As an 'outsider' to the accepted scientific establishment (and in Professor McCalman's words during the program, a 'nobody'), was Wallace treated badly in deference to Darwin?
- After both Darwin's and Wallace's scientific papers are made public, we are informed that Wallace wrote a letter to Darwin, which has since been lost to history. Considering what had happened from the moment Darwin had discovered that Wallace might have 'gazumped' him (in McCalman's words) in ownership and posterity, what do you

think Wallace might have written in that letter? Compose Mr Wallace's letter to Mr Darwin. (You may wish to present this letter on poster paper, and add illustrations as you see fit.)

- You are about to publish what you consider a groundbreaking, original document, when you discover that someone else, a rival, is about to publish a document that is almost identical, and he or she is about to take all the credit and fame. How do you react? Working in small groups, prepare a short play script; rehearse and revise, then carry out a reading to the class.

## 'On the Origin of Species by Means of Natural Selection'

Under pressure to present the results of 20 years research, Darwin's theory of the evolution of species was published in 1859.

- Explain why Darwin uses the process he terms 'artificial selection' as a means to argue the existence of natural selection throughout the history of the Earth. Provide some specific examples, from the program, of 'the remarkable idea that all species on Earth are modified versions of what has gone before – endlessly shaped over time by natural selection'. From the Darwinian viewpoint, what is the importance of ancient fossils?
- In a letter from Huxley to Darwin in 1859, discussing the publication of Darwin's book, Huxley wrote, 'I trust you will not allow yourself to be in any way disgusted or annoyed by the considerable abuse and misrepresentation which unless I greatly mistake is in store for you.' (See 'Thomas Huxley', website references.) Why do you think Huxley made these comments. Was he correct?
- From the program and further research, write a commentary on both Huxley's and Darwin's relationship to Professor Richard Owen. Consider whether Owen was a colleague who was objectively critical of Huxley's and Darwin's scientific views, or whether he was more likely their enemy for other reasons.
- Write a 350-400 word biography of Owen's importance to the study of the natural sciences. Were his scientific views eventually outmoded by Darwin's?
- Discuss the mass media reaction to the

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publication of *The Origin of Species*. Was it fair, rational, accurately represented? Explain.

- Examine and discuss the first two cartoons listed in the website references under 'Darwin cartoons'. What are the viewpoints of these cartoons towards Darwin, his theories of evolution and the state of human beings? What is your own opinion of the cartoons?
- Imagine you are a journalist-reviewer in 1859. Write a review in 200-300 words of *On the Origin of Species*. (You may wish to accompany this with your own cartoon).
- Iain McCalman suggests that the newspapers reported the events of the famous Oxford Debate on Darwinian evolution by natural selection in 'mythic terms'. Explain what he means by this. Write an account of what happened at the debate, the outcome, who was involved, and how the debate affected the participants' reputations. In what ways might it be considered as the turning point towards *On the Origin of Species* being accepted by the scientific establishment?

## The series — an overview

### Themes

- Discuss in class then write your own commentary on whether the program as a whole pursues any particular historical agenda, argument and viewpoint about Darwin, his work and his achievements. Consider, for example, a judgement that the series is a very Australian-oriented version of history. Would you agree with this or not? Support your opinions with evidence from the program. To help you, note that the series in general is based on the writings and contemporary research of historian, Professor Iain McCalman, and that he is one of the on-camera participants throughout the program. You might also wish to examine carefully the comments made by other on-camera participants as to their own argued positions.
- Discuss the importance of the theme of collaboration, friendship and the support of trusted allies and colleagues that continues and develops throughout all three episodes. Examine whether this theme can be applied to the ways in which scientific research is generally pursued. That is, is it typical? To what extent have the characteristics

of collaboration, and even friendship, support and trust been evident in scientific endeavour? You may wish to look at, for example, the work of scientists Louis Pasteur and Marie Curie, and more recently that of Australians who have won the Nobel Prize in Physiology or Medicine, such as Barry Marshall and Robin Warren.

- What role do you think Emma Darwin, a devout Christian, played in her husband's life work? Imagine you were Charles Darwin near the end of his life. Write a set of private diary entries, or a personal reminiscence, about Emma's impact on your life.
- At the end of the series Richard Dawkins says that Darwin 'provided the explanation for my existence and yours and the existence of every living creature'. Where does Darwinist natural selection, as the prime motivator for the ongoing evolution of species, exist today, within the contemporary scientific establishment. Is it widely accepted or not? How does this compare or contrast within the greater social sphere of opinion? For example, how widespread is belief today in Creationism and Intelligent Design? Carry out some research, discuss in class and write your own commentary on these questions.

### Media Studies

- Discuss the meaning and relevance of the title, *Darwin's Brave New World*. Why 'brave new world'? You will find these words originally in William Shakespeare's play, *The Tempest*. In what context do they appear? What links do the words, 'brave new world' have with Darwin's colleague, Thomas Huxley? (For the answer to this, carry out a web search combining the words 'brave new world' with 'Huxley'.)
- Discuss then write a detailed commentary on the dramatisation used in the series. Consider the use and effectiveness of character dialogue, and the ways the historical characters are depicted in terms of lighting, camera angle and distance, positioning on-screen and the editing and pacing of camera shots. Examine how these aspects of film might affect our perception and understanding of the personalities depicted.
- Mark Hamlyn, executive producer of the series, says that the locations of the Southern Hemisphere presented a '*Master and Commander*

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feel to sugar-coat the history pill'. What does he mean? Discuss whether the series 'sugar-coats' history, and perhaps even science?

- Comment on the use, purpose and effectiveness of CGI effects throughout the series. (For example, the scene where the human hand transforms into a webbed fore-foot.) Are they a distraction or a benefit to our understanding and appreciation of the story, the drama, the history and the science on-camera?
- Design and create a display poster to promote the TV series. Consider the theme of the poster, and your use of text, image, colour, space, and visual placement.
- Write a review of the series in 350-400 words for a popular weekly TV magazine or newspaper supplement.

## References and Further Resources

### Books

Note that there are many editions of the well-known works written by Charles Darwin. Those listed below by Darwin are samples.

Janet Browne, *Charles Darwin: A Biography*, Vol 1: *Voyaging*, Knopf, New York, 1995

Janet Browne, *Charles Darwin: A Biography*, Vol 2: *The Power of Place*, Knopf, New York, 2002

Charles Darwin, *On the Origin of Species*, Penguin UK, London, 2009

Charles Darwin, *The Descent of Man and Selection in Relation to Sex*, Cambridge University Press, Cambridge, UK, 2009

Charles Darwin, *The Voyage of the Beagle*, Penguin, London, 1989

Jim Endersby, *Imperial Nature: Joseph Hooker and the Practices of Victorian Science*, University of Chicago Press, Chicago, 2008

Edna Healey, *Emma Darwin: The Inspirational Wife of a Genius*, Headline, London, 2001

Robert Huxley (ed.), *The Great Naturalists*, Thames & Hudson in association with the Natural History Museum, London, 2007

Iain McCalman, *Darwin's Armada: How Four Voyagers to Australasia Won the Battle for Evolution and Changed the World*, Penguin, 2009

Michael Shermer, *In Darwin's Shadow: The Life and Science of Alfred Russel Wallace: A Biographical*

*Study on the Psychology of History*, Oxford University Press, Oxford, 2002

### Film/TV

John Amiel (director), *Creation*, 2009 (Feature film biopic drama about Darwin, to be released in Australia in 2010.)

Stanley Kramer (director), *Inherit the Wind*, 1960 (Feature film based on true story from 1925 about John Scopes, a teacher put on trial in Tennessee, USA, for teaching evolution in a high school.)

Andrew Marr (presenter), *Darwin's Dangerous Idea*, three-part series, BBC and the Open University, 2009

Simon Nasht and Annamaria Talas (directors), *The Hobbit Enigma*, Essential Media, 2008 (Study guide available from Australian Teachers of Media.)

Hannes Schuler and Katharina Von Flotow (directors), *Darwin's Lost Paradise*, Chapman Pictures, 2009 (Study guide available from Australian Teachers of Media.)

Note that a search for 'Charles Darwin' on the IMDB website produces many film titles; some may be helpful, some won't. See 'Darwin film tags' in website references.

### Websites

Chartism:

<http://www.victorianweb.org/history/hist3.html>

<http://en.wikipedia.org/wiki/Chartism>

Charles Darwin:

<http://darwin-online.org.uk/>

[http://en.wikipedia.org/wiki/Charles\\_Darwin](http://en.wikipedia.org/wiki/Charles_Darwin)

<http://dl.screenaustralia.gov.au/tag/Charles+Darwin/>

Emma Darwin:

[http://en.wikipedia.org/wiki/Emma\\_Darwin](http://en.wikipedia.org/wiki/Emma_Darwin)

<http://darwin-online.org.uk/EmmaDiaries.html>

*Darwin's Brave New World* website:

<http://www.screenaustralia.gov.au/showcases/charlesdarwin/>

Darwin Cartoons:

[http://commons.wikimedia.org/wiki/File:Darwin\\_ape.jpg](http://commons.wikimedia.org/wiki/File:Darwin_ape.jpg)

<http://www.guardian.co.uk/science/2008/feb/09/darwin.websites>

[http://www.cartoonstock.com/directory/C/Charles\\_Darwin.asp](http://www.cartoonstock.com/directory/C/Charles_Darwin.asp)

Darwin's Dangerous Idea:

<http://www.open2.net/darwin/dangerousidea/index.html>

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Darwin exhibitions:

<http://www.sl.nsw.gov.au/events/exhibitions/2009/darwin/index.html>

<http://www.anmm.gov.au/site/page.cfm?u=1549>

<http://www.screenaustralia.gov.au/learning/charlesdarwin/>

Darwin film tags:

<http://www.imdb.com/keyword/charles-darwin/>

Deduction and induction:

<http://falcon.jmu.edu/~omearawm/deduction.html>

<http://www.socialresearchmethods.net/kb/dedind.php>

Jelly bean test:

<http://www.fizzicseducation.com.au/experiments/Environmental/jellybean%20evolution.html>

John Gould:

<http://gould.australianmuseum.net.au/naturalist/darwin.htm>

<http://gould.australianmuseum.net.au/naturalist/darwin.htm>

History of evolutionary theory:

[http://evolution.berkeley.edu/evolibrary/search/topicbrowse2.php?topic\\_id=48](http://evolution.berkeley.edu/evolibrary/search/topicbrowse2.php?topic_id=48)

[http://anthro.palomar.edu/evolve/evolve\\_1.htm](http://anthro.palomar.edu/evolve/evolve_1.htm)

HMS *Beagle*:

[http://en.wikipedia.org/wiki/HMS\\_Beagle](http://en.wikipedia.org/wiki/HMS_Beagle)

<http://www.anmm.gov.au/site/page.cfm?u=1544>

<http://www.thebeagleproject.com/>

Joseph Hooker:

<http://www.jdhooker.org.uk/>

[http://en.wikipedia.org/wiki/Joseph\\_Dalton\\_Hooker](http://en.wikipedia.org/wiki/Joseph_Dalton_Hooker)

Thomas Huxley:

<http://www.ucmp.berkeley.edu/history/thuxley.html>

[http://en.wikipedia.org/wiki/Thomas\\_Henry\\_Huxley](http://en.wikipedia.org/wiki/Thomas_Henry_Huxley)

Thomas Malthus:

<http://desip.igc.org/malthus/>

[http://en.wikipedia.org/wiki/Thomas\\_Robert\\_Malthus](http://en.wikipedia.org/wiki/Thomas_Robert_Malthus)

Richard Owen:

<http://www.ucmp.berkeley.edu/history/owen.html>

<http://www.nhm.ac.uk/nature-online/science-of-natural-history/biographies/richard-owen/index.html>

Science and religion:

<http://www.guardian.co.uk/commentisfree/belief/2009/apr/24/religion-science-creationism-reiss>

*Vestiges*:

[http://en.wikipedia.org/wiki/Vestiges\\_of\\_the\\_Natural\\_History\\_of\\_Creation](http://en.wikipedia.org/wiki/Vestiges_of_the_Natural_History_of_Creation)

Alfred Russel Wallace:

<http://wallacefund.info/>

[http://en.wikipedia.org/wiki/Alfred\\_Russel\\_Wallace](http://en.wikipedia.org/wiki/Alfred_Russel_Wallace)

## Darwin's Brave New World

A Screen Australia National Documentary Program. A ScreenWorld and Ferns Productions production. Produced in association with the New South Wales Film and Television Office and the Australian Broadcasting Corporation with the assistance of the Canadian Television Fund and the Canadian Broadcasting Corporation. Made in association with History Television (UK) and ZDF in co-operation with ARTE. An Australia–Canada Co-production.

**Executive Producers:** Sue Clothier (Australia), Mark Hamlyn (Australia) W. Paterson Ferns (Canada)

**Producers:** Mike Bluett (Series Producer), Sally Regan (Australia), Andrew Ferns (Canada)

**Directors:** Lisa Matthews (drama), Jason Bourque (documentary)

**Writer:** Katherine Thomson

**Narrator:** Wendy Hughes

**Year:** 2009

**Duration:** 3 x 54 minute episodes

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