

Extinctions: crises in the history of life

Start date	8 July 2016	End date	10 July 2016
Venue	Madingley Hall Madingley Cambridge		
Tutor	Dr Peter Sheldon	Course code	1516NRX079

Director of Programmes Emma Jennings

For further information on this course, please contact Clare Kerr, Public Programmes Co-ordinator
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To book See: www.ice.cam.ac.uk or telephone 01223 746262

Tutor biography

Dr Peter Sheldon is an Honorary Associate in the Department of Environment, Earth and Ecosystems at the Open University, where he was a Senior Lecturer in Earth Sciences until 2015. He has given 75 residential courses in geology, palaeontology and evolution for the University of Cambridge Institute of Continuing Education since 1979. From 2008 to 2011 he was External Examiner for Scientific Studies at Oxford University's Department for Continuing Education, where he has given over 40 day-schools since 1993. His teaching style combines fieldwork, hands-on study of real specimens of rocks, minerals and fossils, and interactive lectures. He chaired the Open University course on *Geology* and has contributed to many other OU courses, including *Fossils and the History of Life*, *Evolution*, *Earth's Physical Resources*, *Discovering Science*, *The Geological History of the British Isles* and *Earth Science*.

Course Programme

Friday 8 July 2016

Please plan to arrive between 16:30 and 18:30. You can meet other course members in the bar which opens at 18:15. Tea and Coffee making facilities are available in the study bedrooms.

19.00	Dinner
20.30 – 22.00	Early ideas on extinction. The principles of palaeontology and very ancient crises in the history of life.
22.00	Terrace bar open for informal discussion

Saturday 9 July 2016

07.30	Breakfast
09.00 – c.09.40	Short talk followed by field excursion. We may first visit the Sedgwick Museum in Cambridge before going to Needingworth gravel quarry. <i>Please bring stout footwear (essential; preferably walking boots, or wellington boots), waterproof clothing in case of bad weather, and, if you wish, a thermos flask which can be filled at breakfast.</i> <i>N.B. See also 'Equipment Required'.</i> A packed lunch will be provided. Return by 17.30
18.30	Dinner
20:00 – 21:30	Life and death in the Palaeozoic and Mesozoic Eras. Mass extinction by meteorite impact 65 million years ago?
21:30	Terrace bar open for informal discussion

Sunday 10 July 2016

07.30	Breakfast
09.00 – 10.30	Practical session - yesterday's finds and other fossils. Brief review of extinctions covered so far.
10.30	Coffee
11.00 – 12.30	Extinctions in the Cenozoic Era. Human induced extinctions, and the future? Discussion and summing up.
12.45	Lunch

The course will disperse after lunch

Course syllabus

Aims:

This course aims to:

1. Provide a wide-ranging, practical introduction to extinct species and extinctions, including first-hand experience of fossils in the field and teaching room.
2. Stimulate a continuing interest in palaeontology and the history of life.
3. Give course members sufficient basic understanding to enable them to begin to pursue an interest in extinct species and extinctions for themselves.

Content:

Extinction – not just loss of life but loss of genes – is forever. The evidence isn't hard to find. If we go out and look in some of the quarries near Cambridge we can discover fossils of organisms such as ammonites, ichthyosaurs and mammoths that were thriving long ago. Yet these animals and a host of countless others cannot be found alive anywhere in the world today. What happened to them? How did these groups meet their end? Were they victims of a sudden catastrophe or a gradual demise? And how can we tell?

Extinction is one of the most important and intriguing aspects of the history of life on Earth. There appear to have been several times when more than half of all the Earth's species disappeared rather abruptly. In some mass extinctions, survival may have been mostly a matter of chance: more a question of good luck rather than good genes. We shall briefly discuss possible extinction mechanisms and assess the evidence relating to some of these hotly-debated issues. And what of human influences on nature? Just how rapidly are species going extinct today as a result of our activities? Are we witnessing part of another mass extinction?

We will get the chance to collect some fossils of extinct species on a field trip. We may possibly also visit the Sedgwick Museum in Cambridge, where many fine fossils of extinct animals and plants are on display.

Among the topics to be covered during the sessions at Madingley Hall will be:

- early ideas on extinction
- an introduction to fossils
- some extinct groups and how to identify them
- early crises and the extinctions of the Palaeozoic Era
- the end-Cretaceous mass extinction
- human-influenced extinctions

N.B. Level of fitness required Participants will at times need to be able to walk continuously for about 15-20 minutes within quarries and over very rough and quite steep ground for short distances.

No previous background in palaeontology or geology is needed for the course, and no reading is required in advance.

Programme Please note that the field trip on Saturday may be subject to modification, depending on weather, state of the quarry and so on.

Presentation of the course:

The course will employ a wide variety of teaching and learning methods, including a field excursion, lectures with slides, and the opportunity to pick up and personally examine a large number of fossils put out on tables in the teaching room. On Sunday morning, participants are invited to put out their own specimens found on the excursion, so that everyone can examine, identify and learn from each other's finds.

Outcomes:

As a result of the course, within the constraints of the time available, students should be able to:

1. Identify some of the common types of extinct life found in the fossil record, and suggest the geological periods and eras they may have come from.
2. Name a few mass extinction events, giving examples of organisms that became extinct.
3. Outline some of the mechanisms that may have been responsible for mass extinctions.

Equipment Required:

Warm and waterproof clothing — **ESSENTIAL**. Please note that quarries stipulate that, for safety reasons, shorts or skirts should not be worn.

Walking boots (preferably) or wellington boots — **ESSENTIAL**. **N.B.** Ordinary walking shoes or trainers are *not* acceptable. Quarries are nearly always wet and muddy in places, and adequate foot protection is required within working areas, near machinery, etc. Bear in mind that wellington boots can be rather hot to wear in summer (compared with walking boots).

Thermos flask — you might find this to be a good idea.

Notebook, pen, pencil, rubber.

Hand-lens (optional) — you'll find your enjoyment and understanding of rocks, minerals and fossils increases if you have a hand-lens. Some hand-lenses should be available for purchase from Peter Sheldon for only £2 during the course. Hand-lenses can be also bought from stamp shops (philatelists) and some hobby shops. Magnification x 10 is recommended.

Plastic bags (a few strong shopping bags); paper — to wrap specimens.

A geological hammer (optional) — if you have one, it could be useful; otherwise we will lend out a few to share for the trip. Much study can be done without one and there is NO need to obtain a geological hammer for the course. (Note that an ordinary hammer should *not* be used to break open rocks; the metal is too brittle and metal chips may fly off.)

N.B. In addition to suitable footwear (see above), visitors to quarries have to wear standard safety helmets and high-visibility waistcoats. We will supply these items on loan.

Reading:

No reading is required in advance and no books need to be bought (or consulted) for the course. Many useful books on extinction, evolution, geology and palaeontology will be available for people to look at during the weekend, and a detailed and extensive booklist will be provided.

Probably the best recent book on extinctions for the beginner and those with some background is *The Great Extinctions: What Causes Them and How They Shape Life* by Norman MacLeod. (2013). Full colour. 208 pp. The Natural History Museum. ISBN 978-0565092788. £14.99.

Website Addresses:

Among the many excellent websites you may wish to explore if you have access to the Internet are the following, which have links to a vast number of other relevant sites:

<http://www.nhm.ac.uk> - The Natural History Museum, London.

<http://www.ucmp.berkeley.edu> - Many exhibits and palaeontology/evolution links.

<http://www.si.edu> - The Smithsonian Institution.

<http://www.amnh.org> - The American Museum of Natural History.

<http://www.geolsoc.org.uk> - The Geological Society of London.

<http://www.bgs.ac.uk> - British Geological Survey.

Note Students of the Institute of Continuing Education are entitled to 20% discount on books published by Cambridge University Press (CUP) which are purchased at the Press bookshop, 1 Trinity Street, Cambridge (Mon-Sat 9am – 5:30pm, Sun 11am – 5pm). A letter or email confirming acceptance on to a current Institute course should be taken as evidence of enrolment.

Information correct as of 11 May 2016