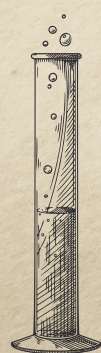


10



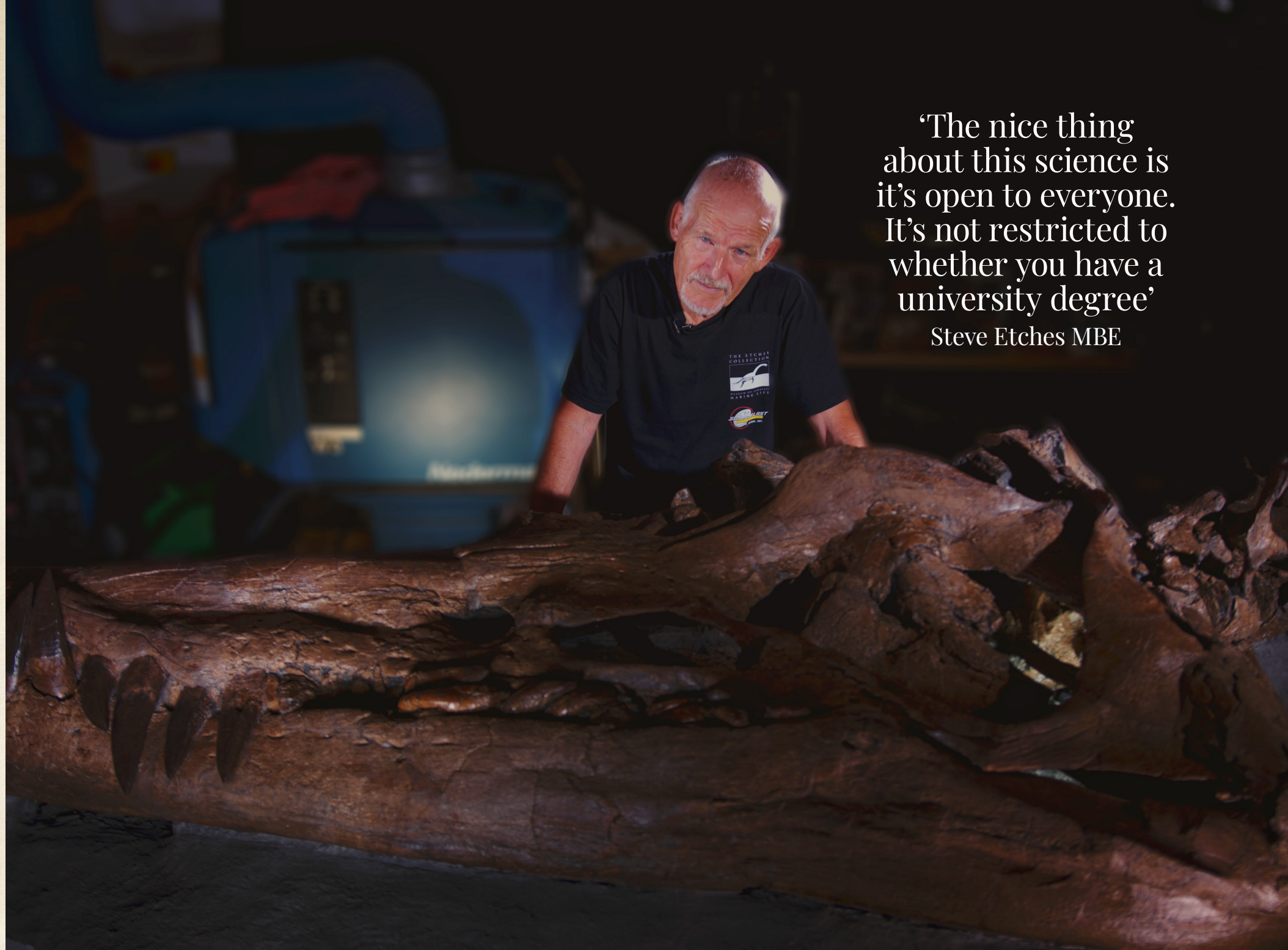
DORSET *Science* HEROES

To celebrate British Science Week, Rachael Rowe introduces us to some of Dorset's innovative trailblazers



From Mary Anning's palaeontological discoveries on the fossil-strewn beaches of Charmouth and Lyme Regis to Robert Boyle's pioneering laboratory experiments in Stalbridge, Dorset can celebrate both historic and contemporary scientific geniuses. Not only have the county's men and women trailblazed medical innovations, but they have also championed citizen science and conservation. Drawn from the ranks of local science heroes across the centuries, let me introduce you to just 10 of them.

PHOTO SUPPLIED BY THE ETCHES COLLECTION



above:
Steve Etches with the
'Sea-Rex' plesiosaur
skull discovered in the
cliffs at Kimmeridge

DR STEVE ETCHES MBE

When Steve Etches started collecting fossils from Kimmeridge on the Jurassic Coast, he had no idea how big his collection would get. The former plumber got hooked on fossil collecting after finding a fossilised flint sea urchin as a five-year-old in 1954 and is mostly self-taught. Over the next 30 years his collection grew until it took over his home. In 2014, a Heritage Lottery grant helped to fund the building of an inspirational state-of-the-art museum on the site of the old village hall in Kimmeridge to house his local finds.

The Etches Collection Museum of Jurassic Marine Life, which opened in 2016, contains

over 2,800 fossils from the Kimmeridge area, including the intimidating-looking plesiosaur skull – known as Sea-Rex – found in the nearby cliffs. The story of this exciting discovery was revealed in a David Attenborough television programme in 2023. There is also a laboratory so visitors can see science in action.

Steve Etches is a renowned expert in Kimmeridgian geology and has several new species attributed to him, including a new hybodontiform shark (*Durnonovariaodus maiseyi*) and a pterosaur (*Cuspicephalus scarfi*). Seven species have been named after

him, including a batoid ray (*Kimmerobatis etchesi*) and a cirripede (*Etcheslepus durotrigensis*). The author of several papers, as well as contributing to various books, Etches continues to lead fossil hunting tours on the Kimmeridge coastline. He has received several awards for his contribution to palaeontology including the Halstead Medal of the Geologists' Association in 2006 and an MBE in 2014. Described as a modern-day Mary Anning, Etches continues to inspire people with his enthusiasm for Kimmeridge's fossils.

theetchescollection.org





PROFESSOR DAME FRANCES MARY ASHCROFT

Born in 1952, it was when Professor Dame Frances Mary Ashcroft (above) was at Bournemouth's Talbot Heath School, that she developed a love of science leading to a prominent career in physiology. At the heart of her research are ion channels, a type of membrane protein in cells, and their role in both normal blood glucose control and diabetes.

Professor Ashcroft has BA, PhD, and ScD degrees from Cambridge University, is a Fellow of Trinity College, Oxford, and a Professor of Physiology at the University of Oxford. In 1999 she was elected a Fellow of the Royal Society of London.

Her research investigates how genetic mutations affect ion channels, how cell metabolism affects activity in these channels, and their structure and function. Professor Ashcroft's team has shed light on how insulin is released when stimulated by a raised blood sugar and how this is impaired in diabetes. She also explores what type of drugs can be used to treat the problem. Her work has led to groundbreaking discoveries in how a rare inherited diabetes that manifests within the first six months of life (neonatal diabetes) is caused and how it is treated. This enabled patients to switch from injecting insulin to taking a pill, which greatly improved their clinical condition and quality of life.

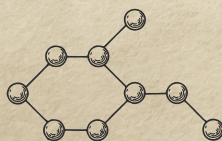
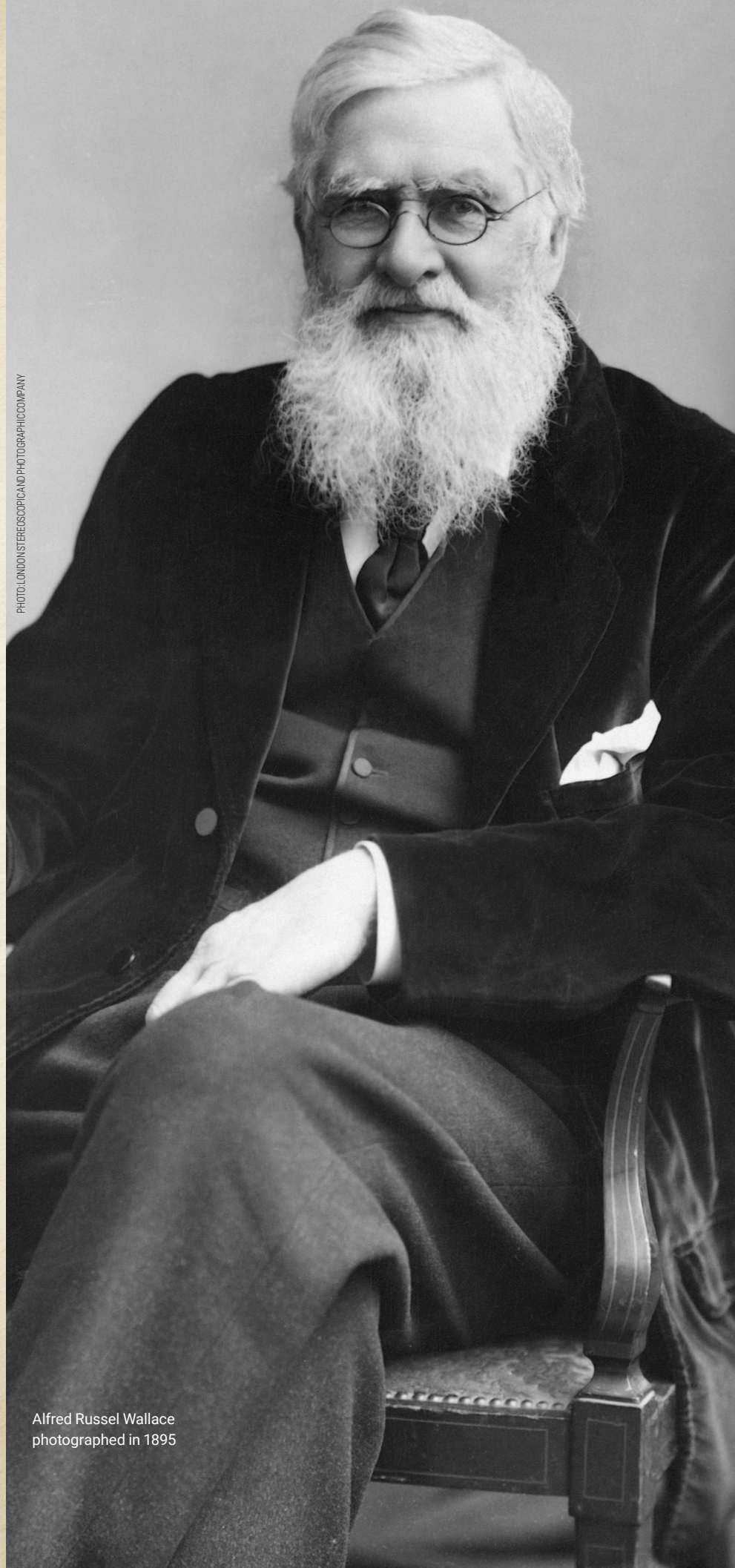


PHOTO: LONDON STEREOSCOPIC AND PHOTOGRAPHIC COMPANY



Alfred Russel Wallace
photographed in 1895



ALFRED RUSSEL WALLACE (1823-1913)

Sometimes referred to as Dorset's Darwin, Alfred Russel Wallace may have been born in Wales, but he spent his latter years in Parkstone and Broadstone. Mostly self-taught, Wallace loved nature. As he travelled the country working with his older brother during the expansion of the railway system, he made the most of every moment observing plants and wildlife. Charles Darwin's 1839 book *The Voyage of the Beagle* inspired Wallace to read scientific papers and learn more about evolutionary theory.

In 1848, Wallace travelled to the Amazon with another naturalist, Henry Walter Bates. They spent the next four years observing and collecting thousands of insect, plant and animal species. Wallace hoped to profit by selling species to nature enthusiasts but a boat fire off Bermuda scuppered this plan. Next, Wallace travelled to Indonesia where he collected many specimens, identifying new species. One of his best known is Wallace's standard-wing bird of paradise (*Semioptera wallacei*) and the Rajah Brooke's birdwing butterfly (*Trogonoptera brookiana*).

However, what distinguished Wallace from a standard specimen collector was his thoughts on evolutionary theory. During

an episode of malaria, he reflected on the ability of some insects to reproduce rapidly and, when considering this, he came up with the concept of survival of the fittest. However, he was not the only scientist considering this theory. Wallace wrote to Charles Darwin about this idea and while the latter was also considering evolutionary theories, he had not finalised his research. There followed a dilemma as to who had discovered it first; something that continues to this day.

In the end, both scientists presented their findings jointly in July 1858 at the Linnean Society. Although the theory of evolution was forever linked with Charles Darwin, Wallace remained in close contact with him until Darwin's death in 1882. Wallace retired to Dorset with his wife Annie in 1889, he lived first in Parkstone and then in Broadstone. He was a member of the Bournemouth Natural Science Society and an honorary member of the Dorset Natural History and Antiquarian Field Club. Wallace died aged 90, his resting place in Broadstone Cemetery is marked by a large piece of fossilised wood from a Dorset beach. Displays of his work are in Dorset Museum and the Natural History Museum in London.

CYRIL DIVER (1892-1969)

When Captain Cyril Diver fought on the Western Front in the First World War, he started observing snails in the trenches as a distraction from the horrors unfolding around him. That act of simple observation led to significant conservation studies at Studland in Dorset. It was also one of the first examples of citizen science.

During the 1930s there was significant concern that the Studland Peninsula would be built on as housing developments progressed across the country. Diver decided to act and, together with a group of friends, conducted a meticulous survey of Studland, examining each part of the heathland and dunes. The survey included an internationally significant inland lake known as The Little Sea and over 350 hectares of diverse ecosystems, including woodland and sand dunes. Remarkably, over 2,500 species were recorded, and development at Studland was halted. The survey work ceased during the Second World War as the Studland Peninsula

was commandeered by the military for exercises, and there was a significant danger from unexploded ordnance. Once they had departed, Diver wrote about how useful disused pillboxes and shell craters were as wildlife habitats.

However, he didn't stop once the Studland Peninsula was saved. By now, he was a civil servant and spent time leading and devising Nature Conservancy UK in 1949, a forerunner of many conservation organisations. Diver's impact on raising awareness of the environment was pivotal to protecting nature and in legislating on conservation, yet he is almost forgotten today. In 2012, the National Trust conducted a similar survey at Studland, naming it the Cyril Diver Project and using his original records as a baseline. Over 3,500 species were found, with new habitats attracting nature on the peninsula and heathland. Diver's records are available online at the Dorset History Archive (archive-catalogue.dorsetcouncil.gov.uk/records/D-DVR).

SCIENCE HEROES



DR JANE GOODALL DBE

90-year-old Dr Jane Goodall (above) has spent 60 years studying primates and is considered the world's foremost expert in chimpanzees. Her work on conservation is critical; in 1900 there were over one million chimpanzees in the world – today there are 340,000. Goodall's interest in primates was sparked when her father gave her a toy chimpanzee instead of a teddy bear as a child. Born in London in 1934, Goodall's family later moved to Bournemouth where she attended Uplands School in Poole.

In 1960, Goodall travelled to Tanzania with not much more than a pair of binoculars, a notebook and an immense passion for her subject. She spent hours observing chimpanzees and championed ways to ensure their survival in a changing world. One of Goodall's most famous discoveries was that chimpanzees make and use tools. Her work at the Gombe Forest in Tanzania redefined the relationship between chimpanzees and humans.

In 1977, she established the Jane Goodall Institute in Gombe to accelerate research in the area. She not only studied chimpanzee behaviour, but also the dangers of deforestation to other species. Critically, Goodall realised the important role played by communities in conservation. Roots & Shoots is a programme she co-founded with young people to lobby world leaders about the importance of conservation.

Goodall has authored numerous research papers and books including *In the Shadow of Man* and *Seeds of Hope* which detail her work on conservation and the environment. World Chimpanzee Day, held on July 14 each year, marks the day Jane Goodall first set foot in Tanzania.



NELSON
AND HELEN
RICHARDSON
(1855–1925/1936)

Husband and wife team Nelson and Helen Richardson had a shared passion for moths and butterflies which they observed and documented near their home at Chickerell near Weymouth. Work like this is increasingly important as it helps identify the impact of climate change and which species are most at risk. Butterfly and moth species are fragile in structure, so their appearance and disappearance are a critical marker of environmental change.

Named after them, Richardson’s case-bearer (*Eudarcia richardsoni*) is a tiny moth species only found on Portland. The couple discovered it on one of their many field trips in the late 19th century. Nelson Richardson (1855–1925) had many natural history interests, discovering several new moth species. Nelson also found a nearly complete plesiosaur skeleton near their Dorset home which was identified as a new species and named after him (*Cryptoclidus richardsoni*).

‘Nelson found a nearly complete plesiosaur skeleton near their Dorset home’

Helen Richardson (c1855–1936) collected moths at night on Portland. She was also an artist, illustrating many of her husband’s papers with detailed water colour paintings. She discovered the tiny moth known as little ghost (*Ischnoscia Borreonella*) on Portland in 1890. Nelson Richardson shared his findings with other entomologists at the Dorset Natural History and Antiquarian Field Club. Helen only became a member of this society in 1924, shortly before her husband’s death. Displays of the butterflies collected by the Richardsons are on display in Dorset Museum & Art Gallery in Dorchester.

Case containing some of the butterflies collected locally by Nelson and Helen Richardson which is now on display at Dorset Museum



IMAGE: ENGRAVING BY A. BLOTTING, WELLS COLLECTION, CREATIVE COMMONS

NATHANIEL HIGHMORE (1613–1685)

British surgeon Nathaniel Highmore (above) was educated in Dorset at Sherborne School, then at Trinity College and Queen's College Oxford. After qualifying as a Doctor of Medicine, Highmore practised in Sherborne. He is best known for his anatomical theories and descriptions. In 1651 he wrote his first book, *Corporis Humani Disquisitio* (*Disquisition on the Human Body*) which was dedicated to his good friend William Harvey who discovered the circulation of the blood. At the time, surgery as we know it today was not widely developed, especially internal surgical operations. Doctors relied on dissection or chance findings to identify and describe body organs. As they gradually understood more, modern surgery began to develop. Highmore dissected dogs, sheep, and even an ostrich to find out more about anatomy.

Highmore is famous for his description of one of the accessory nasal sinuses. He first identified the area around the maxilla when examining a patient with an abscess which was draining into the mouth and was treated by extracting a tooth. Remember, this was at a time when anaesthetics and antiseptics were non-existent. Noting the cavity, Highmore duly described it, naming it the 'Antrum of Highmore' also known as the maxillary sinus. He also described the scrotal septum where the scrotum divides into two sections, each containing a testicle.

Nathaniel Highmore is buried at the village church at Purse Caundle where his father was the parish rector. During his time as a doctor, he never charged the clergy for his services.



JOHN FREKE (1685–1756)

Anyone who has had a forceps delivery will have experienced the legacy of John Freke. Born to the rector of Okeford Fitzpaine in 1685, he grew up in the village before being apprenticed to Richard Blundell, a barber-surgeon in London, aged 17. At that time, barber-surgeons performed wound dressings, lanced boils, as well as cutting beards and hair. After qualifying as a barber-surgeon Freke became a surgeon at St Bartholomew's Hospital in London in 1720. This was at a time when the surgical profession was developing specialist skills and distancing itself from the inconsistencies associated with barber-surgeons. Freke was instrumental in this and was invited by the governors at St Bartholomew's Hospital to become the first ophthalmic surgeon, where he performed couching for cataracts (dislodging a cataract from the eye's lens using a sharp needle). He penned opinions on the conduction of electricity, and established the pathology museum at Barts Hospital, which became a

valued teaching resource. In 1748 he wrote an influential paper, *An Essay on the Art of Healing*, which included the risks of not removing breast and lymph tissue in cancer surgery. John Freke is best known for his invention of a safer obstetrics forceps with a rounded blade, improving both grip and safety for mother and child. In 1746, Freke became one of the founder members of the College of Surgeons, later the Royal College of Surgeons, setting out training standards for surgery so people got safer care.

During the 1730's the artist William Hogarth was commissioned to paint two artworks for a newly designed North Wing at Barts Hospital. *The Good Samaritan* and *Pool of Bethesda* feature characters with medical conditions. Freke advised Hogarth on the visual appearance of the illnesses, and the artwork continues to be a teaching aid to medical students today. John Freke died in 1756. A memorial plaque in Okeford Fitzpaine marks the site of the old rectory where he was born and grew up.

DR MARIE STOPES (1880–1958)

Born in Edinburgh in 1880, Marie Charlotte Carmichael Stopes is best known for her pioneering work on birth control and women's rights. However, she was also a suffragist and an established palaeobotanist and has strong connections to Dorset.

Stopes studied in universities in London and Munich where she achieved her PhD in Jurassic cycads. She married Reginald Ruggles Gates in 1911. Unfortunately, the marriage broke down because Gates was impotent, but the experience sparked an interest in relationships with Stopes writing *Married Love*, in 1918. Although the church and the press condemned the book, it sold over 2,000 copies overnight and resulted in thousands of women contacting Stopes for advice.

In 1921, Marie Stopes opened a family planning clinic in London, the first in Britain. The concept spread quickly, leading to the establishment of family planning clinics across the country by the 1930s. Her second husband, Humphrey Verdon Roe, who she married in 1924, was very supportive of her views. Stopes' work on birth control and her opinions on eugenics were controversial at the time, promoting criticism from the church, in particular. However, she helped many women avoid the risks of illegal back street abortions and to have more control over their health.



PHOTO: WELLS COLLECTION, WIKICOMMONS

Marie Stopes at the time of her second marriage in the 1920s

Palaeobotany brought Stopes to Dorset in 1923 due to her interest in fossils of Jurassic cycad plants, which had been abundant on the Isle of Portland. She bought the Old Higher Lighthouse to live in and established the Portland Museum.

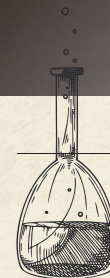
portlandmuseum.co.uk

‘Moule detested the water closet as he believed it polluted God's rivers and the sea’



PHOTO: DORSET MUSEUM

Henry Moule's 1873 patented earth closet



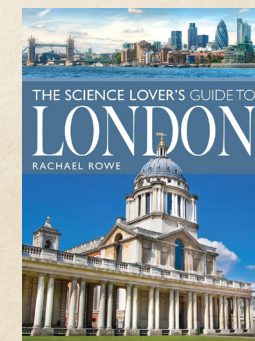
REVEREND HENRY MOULE (1801–1880)

There's nothing like an overpowering cesspit to focus the mind on improvements. During the 1850s Dorset suffered several cholera outbreaks which killed many. Henry Moule, vicar of St George's at Fordington, at that time a village near Dorchester, wanted to do something to help his parishioners so in 1859 he built the first earth closet. Being a religious man, Moule detested the water closet as he believed it polluted God's rivers and the sea. He also thought it a waste of God's nutrients as excrement was not returned to the soil where it could help fertilise crops.

Moule discovered that if dry earth was mixed with human waste through the closet, it returned clean compost in a few weeks. He patented the design for a mechanical earth closet in 1873. The device

allowed human excrement to be saved for composting but crucially, without the foul smell associated with loos at the time. More importantly, by having effective sanitation in place, hundreds of lives were saved as the clever design prevented the spread of disease.

The earth closet works by having a supply of dry soil in a hopper behind the toilet seat with a removable bucket beneath it. Once someone has finished their ablutions, they pull a chain which releases soil onto the waste. Covering waste with soil gets rid of the smell and enables the excrement to break down naturally. Once the bucket is full, the soil can be dug into gardens and fields where it becomes a natural fertiliser. One of Henry Moule's earth closets is on display at Dorset Museum. ●



MEET THE WRITER

Rachael Rowe is a writer and journalist living in Dorset. Her book, *The Science Lover's Guide to London* is published by Pen and Sword. British Science Week is a 10-day celebration of science, technology, engineering and maths running from March 7 – 16. britishscienceweek.org