208 to 65 million years ago

Jurassic and Cretaceous

Select the caption you wish to read from the index below or scroll down to read them all in turn

20 - Fossil echinoderms (starfish and sea urchins)

21 - The slate pencil sea urchin

Fossil fish

22-23 - Cartilaginous fish vertebrae

24-25 - Shark fin-spines

26 - Shark palatal tooth

27-28 - Fossil shark teeth

29 - Shark teeth

30 - Fossil shark

31 - Fossil bony fish

32 - Fossil bony fish

33-35 - Fossil sponge

36-37 - Fossil sponges

38-39 - Fossil sponge

40-41 - Fossil coral

42 - Fossil bryozoans

Crinoids

43 - Sea lily

44-47 - Feather stars

48 - Sea lily

49 - Plesiosaur jaw

50-53 - Ammonites

54-56 - Fossil serpulid worm tubes

57 - Devonshire bats

58 - Basing axe

59 - Geological map of the Channel

Ichthyosaurs

Ichthyosaurs were giant predatory marine reptiles that swam in the Earth's oceans 90‑200 million years ago. Outwardly, they resembled both fish and dolphins. Like dolphins, they were air‑breathing and gave birth to live young. However, like fish, ichthyosaurs swam by moving their tail from side to side and using their paddle‑like flippers for stabilisation.

The first ichthyosaur to be described came from Lyme Regis and was collected by Mary Anning in 1811. F.W.L. Ross may have purchased some of her specimens for his museum in Topsham.

1 - Ichthyosaur

Ichthyosaurus communis brevirostrus
Lyme Regis, Dorset

2 - Juvenile ichthyosaur paddle

Ichthyosaurus species
Lyme Regis, Dorset

3 - Ichthyosaur vertebra

Ichthyosaurus species
Lyme Regis, Dorset

4 - Ichthyosaur jaw

Ichthyosaurus communis
Lyme Regis, Dorset

5 - Ichthyosaur paddle

Ichthyosaurus species
Lyme Regis, Dorset

6 - Flint nodule

Beer Quarry

Flint is a member of the chert family of minerals, composed largely of silicon oxide in microcrystalline form. The silica may have come from spicules that form the internal structures of sea sponges. Flints occur as nodules, frequently in layers, in chalk and some limestones. This typical flint nodule has a dark glossy core and white cortex, or skin, where it was in contact with the chalk.

7-10 - Fossilised wood

Portland and Lyme Regis, Dorset and Seaton, Devon

When wood and plant debris was washed out to sea some became waterlogged. It sank to the sea floor where it was buried and eventually fossilised. Some specimens were preserved in their three-dimensional shape and are clearly recognisable as wood, with roots and branches, branch scars and even cell structure.

11 - Fossilised conifer twig

The fine structure of the conifer leaves has been preserved in this fossil.

12 - Fossil wood with mollusc borings

Haldon Hill

Wood-boring bivalve molluscs of the family Teredinidae made holes in this piece of wood before it became fossilised. The holes are visible as crystal-lined tubes. The modern shipworm Teredo is in the same family.

13 - Fossil wood preserved in a flint nodule

Wood is relatively rare in chalk deposits. This is because chalk was laid down in deep water some distance from coastal and estuarine sources of wood. This fine preservation has allowed the fibrous structure of the wood to be revealed.

14 - Juvenile ichthyosaur

Ichthyosaurus communis
Lyme Regis, Dorset

15 - Group of fossil shells

Myophorella clavellata
Osmington, Dorset

The fossilised shells of these bivalve molluscs, the ‘cockles of the Mesozoic’, are found in abundance in strata near Osmington, Dorset.

16 - Fossil bivalve mollusc

Haldon Hill

17 - Fossil bivalve as a mould in flint

Cremnoceramus species
Haldon Hill

It is common to find bivalves from the inoceramid family in the chalk from which this flint was derived. They have characteristically ridged shells.

18-19 - Bivalve mollusc

Plagiostoma giganteum
Lyme Regis, Dorset

Giganteum is the largest species of Plagiostoma. Their fossils are usually found in the muddy limestone beds of the Blue Lias, so it is likely that they burrowed into the surface mud of the sea floor.

20 - Fossil echinoderms (starfish and sea urchins)

Haldon Hill and Sidmouth area

Sea urchins are often found in flint nodules. On Haldon, the soft chalk formerly overlaying the Upper Greensand has been completely lost to erosion, leaving behind a thick bed of flints, rich in fossils. To the east of Sidmouth, chalk cliff exposures continue to reveal further echinoderm fossils. On the East Devon beaches the sharp-eyed may find preserved sea urchins which can be identified by their fivefold symmetry.

21 - The slate pencil sea urchin

Heterocentrotus trigonarius

Heterocentrotus is found in the tropical waters of the Pacific off southern India. It is a modern representative of the large-spined regular sea urchins found fossilised in the chalk of the Cretaceous seas. The life style of Heterocentrotus may reflect that of its early ancestors, crawling over the sea floor on rows of tube feet, feeding with the jawed mouth on the underside of the body. In life the spines shown surrounding the urchin test (shell) would have been attached to its upper surface.

Fossil fish

Although the Jurassic and Cretaceous periods are better known for large marine reptiles, fossils of cartilaginous and bony fish commonly turn up in Devon. The most frequently found parts of cartilaginous fish, sharks, skates and rays, are their teeth. Shark teeth may be pointed and sharp, adapted for biting chunks from their prey, or flattened and grooved to crush well-protected prey such as crabs and molluscs. Hybodus sharks were unusual in having both types of teeth.

22-23 - Cartilaginous fish vertebrae

Beer

24-25 - Shark fin-spines

Hybodus reticulatus and *Hybodus* species
Lyme Regis, Dorset

A strong spine supported the front edges of the upright dorsal fins of this early shark. They probably had a protective function for this predator and scavenger.

26 - Shark palatal tooth

Ptychodus species
Haldon Hill

Some Ptychodus species were massive fish that appear to be adapted for a diet of large bivalve molluscs and ammonites. They may have been slow-moving fish since their prey was not adapted for rapid evasion of predators. Little but their teeth and jaws have been found as fossils.

27-28 - Fossil shark teeth

Acrolamna acuminate and *Odontaspis elegans*
Haldon Hill and Beer Quarries

Mackerel sharks and sand tiger sharks, as they are commonly known, were both fearsome predators.

29 - Shark teeth

Hybodus delabechi
Lyme Regis, Dorset

A bottom-feeding shark equipped with mollusc-crushing teeth.

30 - Fossil shark

Ptychodus species
Beer

31 - Fossil bony fish

Haldon Hill

The head and part of the body are preserved in this fossil showing that this species had large eyes.

32 - Fossil bony fish

Dapedius species
Lyme Regis, Dorset

33-35 - Fossil sponge

Siphonia pyriformis
Western Blackdown Hills

This pear-shaped, or pyriform, species of sponge grew on an elongated stalk that was rooted in the sea floor.

36-37 - Fossil sponges

Haldon Hill

38-39 - Fossil sponge

Ocellaria species

40-41 - Fossil coral

Elliptocoenia cf. minutissima and *Elliptocoenia stricta*
Haldon Hills

Unfortunately not all fossils have a simple common name that is easy to pronounce. These corals, pronounced ‘elliptoseenia’, come from a unique and restricted band in the Haldon Upper Greensand. It was laid down in a shallow current-swept sea that may have lapped round an island formed by the Dartmoor granite.

42 - Fossil bryozoans

Spiropora macropora
Haldon Hill

Bryozoans, or ‘moss animals’, are colonies of tiny animals, usually encrusting and calcareous, which feed with tentacles. They are an ancient group appearing in the Ordovician and quite common as fossils, particularly in calcareous rocks. They are abundant in modern seas and are often found around the coast as white patches on the seaweed Laminaria.

Crinoids

Feather stars and sea lilies are so called for their delicate feather-like feeding arms. They are collectively known as crinoids. Crinoids are a kind of echinoderm and are closely related to sea urchins and starfish. They still inhabit the Earth's oceans today. In their adult form sea lilies are attached to rocks and the sea floor by segmented stems with a star-shaped cross-section. Feather stars lack this stem and are free-floating.

43 - Sea lily

Pentacrinus species
Lyme Regis, Dorset

44-47 - Feather stars

Marsupites species
Haldon Hill, Devon and Blandford, Dorset

These fossils are moulds of the plates which formed the calyx or cup that held the body of the animal.

48 - Sea lily

Possibly from Lyme Regis, Dorset

49 - Plesiosaur jaw

Near Lyme Regis, Dorset

Plesiosaurs were swimming predatory reptiles with an elongated body, four big flippers and a long neck. The first plesiosaur skeletons were found near Lyme Regis by local fossil hunter Mary Anning in the early 1820s. Her discovery provided the inspiration for Thomas Hawkins' Book of the Great Sea Dragons which was published in 1840. The Loch Ness monster has been attributed to a surviving plesiosaur.

50-53 - Ammonites

Various species
Blackdown Hills and near Aylesbury, Buckinghamshire

Ammonites were shelled organisms that were probably good swimmers living in open water. They resembled modern nautiluses but are more closely related to modern cuttlefish, octopus and squid. They are excellent index fossils. This means that geologists can use them to figure out the age of the rock layer in which they were found.

54-56 - Fossil serpulid worm tubes

Rotularia species
Blackborough Common and East Devon area

Many species of marine worms secrete protective tubes made of calcium carbonate. These distinctive coiled tubes are quite common fossils in the Upper Greensand rocks of eastern Devon. They show the presence of worms whose soft bodies would not themselves have been preserved as fossils.

57 - Devonshire bats

These distinctively shaped whetstones were carved and shaped by hand from sandstone mined from the Upper Greensand outcrop on the western edge of the Blackdown Hills. The sandstone was fairly soft at first but hardened on drying out. Their production was a major industry for local families around Blackborough. The bats were sold at an annual fair in Exeter and hundreds of thousands were exported through Topsham and Bridgewater, reaching as far as Australia.
Devonshire bats were principally used for sharpening scythes at harvest time. As many as three could be used in a day, as a scythe might need sharpening every 15 minutes.

58 - Basing axe

This tool was used for the preliminary shaping of the freshly mined sandstone used to make the whetstones which were known as Devonshire bats.

59 - Geological map of the Channel

1882

This early geological map of the Channel between Dover and Pas de Calais dates from 1882. It was made to provide a guide for the early attempts to construct a tunnel beneath the Channel – attempts which were quickly abandoned.