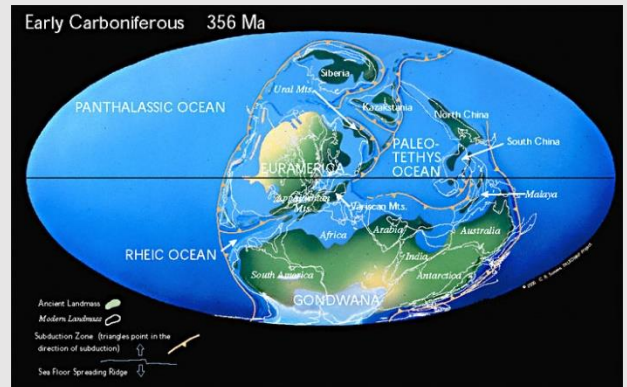


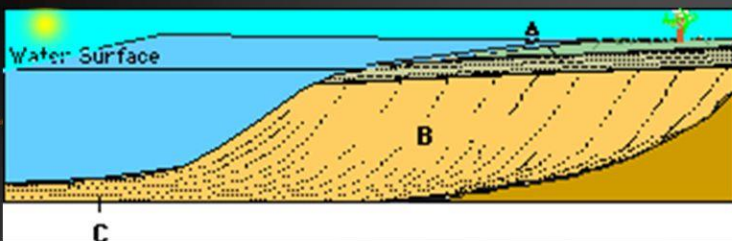
THE FUTURE OF BRITISH COAL

COAL AND THE BRITISH ISLES

- Most coal in the British Isles is of **Carboniferous Age** (360Ma).
- At that time, Britain was part of **Pangea** and **located near the equator** so the climate was **tropical, hot and humid**.
- Coal formed in the **topsets of cyclothem**s deposited by large deltas **prograding from the North**. The coal seems form between 1/10 to 1/100 of the **Coal Measures** strata in the **cyclothem**s.
- The map shows the **occurrence of coal** in the British Isles but **not all of it constitutes reserves**. This is because many of the seams are **too thin or faulted to be economic to work**.

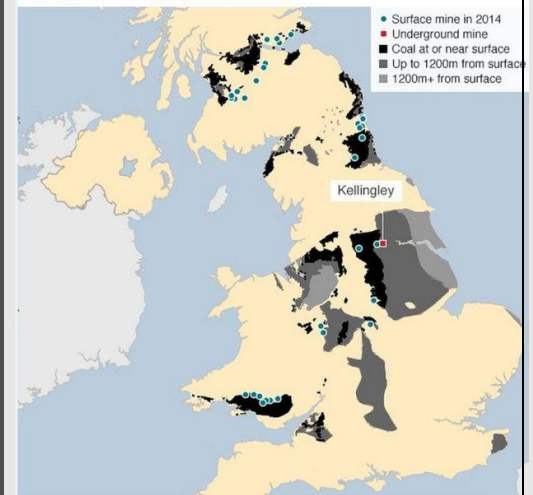


Delta Sediments



- These beds are called **topset** beds and can be seen on the cross-section (A).
- These deposits get finer as the delta progresses into the sea as the energy drops.
- At the front slope of the delta there are finer sandstones with cross-lamination, these are **Foreset** beds (B).
- Where the delta front levels out onto the seabed the sediment is a finer still possibly siltstones or even marine limestones and these are the **Bottomset** beds (C).

UK still has surface coal mines



Source: British Geological Survey

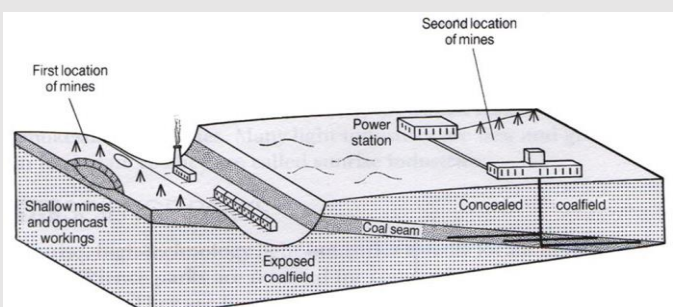
BBC

TYPES OF COALFIELDS

Exposed coalfields were the first to be mined due to their ease of working. However, as the **seams** were followed underground, underground **concealed coalfields** were discovered and then extensively mined.

- A **cyclothem** is a repeated cycle of sedimentation.
- Coal measures** is the name for **Carboniferous-age-coal-bearing strata**.
- An **exposed coalfield** is where coal-bearing strata outcrop at the surface.
- A **concealed coalfield** is where coal-bearing strata are below the surface, overlain by younger rock.

Few fields, such as the **Kent coalfield** or the Southern North Sea Basin (really used for gas extraction) are totally concealed with **no outcrop**.



THE SOUTH WALES COALFIELD

Carboniferous coal measures of South Wales were deposited as **deltaic sediments** (topsets in a cyclothem) in an **east-west** trending **sedimentary basin**.

South Wales was folded into a **synclinal structure** with the **centre being buried the deepest**. This formed the valuable resource, **anthracite coal**. However, the **depth of burial** makes mining costly due to the large overburden. Moreover, the strong deformation has **caused faulting** of the complex geology which does not aid mining. Moreover, the **synclinal structure** is more difficult to follow when using longwall mining, the machines may encounter other rock strata of a different hardness.

The coal in this pit became **uneconomic to extract in the 1980s** and so the mine was the first to close.

Sedimentary basins are regions of Earth of long-term subsidence creating accommodation space for infilling by sediments.

CASE STUDY - IMPORTANT

Tower Colliery was the **last remaining underground coal mine in Wales**. Coal mining began in 1864, making the oldest continuously worked underground mine of the British Isles.

During 1994, British Coal closed Tower Colliery down due to the expense of mining. Each miner **pledged their redundancy pay-outs to raise two million pounds** needed to buy the mine. **The miners marched back to the pit** in 1995 and production began again the next day. It has remained profitable ever since. In 2008, reserves became exhausted so the mine closed.

THE YORKSHIRE COALFIELD

1. Situated to the **East of the Pennines**.
2. The **Carboniferous Coal Measures** were formed when **deltaic sediments** accumulated in a large **sedimentary basin** called the **Pennine Basin**.
3. At the **end of the Carboniferous age**, the rocks were folded into an **anticline** structure, forming the Pennines.
4. The **Coal measures were eroded off** the top of the **anticline**, leaving **Yorkshire and Lancashire** coalfields on either side.

CENTRALIA, PENNSYLVANIA, USA

Anthracite mining was once the main economic activity of the prosperous town of Centralia, Pennsylvania. However, in 1962, an exposed coal seam **caught fire** when rubbish was being burnt at the local tip.

It was not until 17 years later that the locals realised how serious the problem was as the **fire was never put out**. A petrol station owner found the temperature in an underground petrol storage tank was 77.8°C. Elsewhere, people realised their floors were hot to the touch and smoke began to seep from the ground all over the town.

Most of the buildings were bulldozed to the ground and people relocated in 2002. The ground fire is still burning and the reserves are estimated to last for another 250 years.



ENVIRONMENTAL CONSEQUENCES OF COAL MINING

Opencast mining	Longwall mining
Noise, dust and visual pollution	Spoil heaps are formed and spoil the landscape as well as being unstable. Rainwater running off spoil heaps is contaminated too.
Nearby rivers can become polluted by toxic heavy metals which occur naturally in the soil. Acid mine drainage water contains toxic metals like lead and cadmium from abandoned coal and metal mines.	Space for mine buildings and winding gear is needed at the surface.
After the restoration of a mine, the original ecosystem has been disturbed and has a lower biodiversity.	Surface subsidence is a big problem. This occurs as the mined-out area is allowed to collapse so a shallow subsidence bowl forms at the surface.
	Underground mining can trigger earthquakes
	Once mines are no longer used, pumping of excess groundwater ceases so the mine overflows with water. This may leak out to the surface and contains highly toxic metals in acidic water that pollutes groundwater and surface water.

SUSTAINABILITY OF BRITISH COAL

Coal is a fossil fuel so is a **non-renewable resource** making it ultimately unsustainable. However, the recent rise in oil and gas prices, coupled with advances in 'clean coal technology', has led to an increase in demand for coal, and its price.

Mines in South Wales, having been closed for 20 years, reopened in 2007. More is being invested into reopening old coal mines suggesting British coal has a future.

By law, once an **opencast operation is complete, the area must be restored**. This usually involves refilling the hole with the overburden, covering it with topsoil and seeding it with grass. The land may then be returned to agricultural use.

The spoil heaps created by longwall mining (underground mining) are often reworked or removed.