Central England area - Central area

This central area forms about half of the region and comprises two types of geological setting:

- down-faulted basins with thick younger sedimentary bedrock sequences similar to the situation described in Cheshire-Shropshire; and.
- up-faulted blocks which bring coal-bearing older sedimentary bedrock and basement rocks to the surface.

The boundaries between these contrasting settings are often sharply defined by major geological faults.

Red mudstones (Mercia Mudstone) resting on a marked erosion surface (unconformity) on a much older Ordovician igneous intrusion, Croft Quarry, Leicestershire. P581675.

Sedimentary Bedrock The younger sedimentary bedrock in the Central area are preserved in the down-faulted basins, which are developed around Stafford, Uttoxeter, Worcester, Redditch, Derby, Loughborough, Leicester and Hinckley. Most of these areas are underlain by the mainly red Mercia Mudstone (Plate P581675), similar to that present in Cheshire-Shropshire. The maximum thickness found is north of Worcester with 1200 m, elsewhere, they vary between 200 to 400 m thick. Gypsum, which is used as a fertiliser and the main constituent of many forms of plaster, occurs as thick layers in some areas and has been mined northwest of Burton upon Trent to depths of up to 90 m and between Leicester and Nottingham to depths up to 150 m. Rock salt has been mined in the Stafford and Droitwich areas, where surface subsidence occurs as a result. It is also present between Burton
upon Trent and Stoke-on-Trent but has not been mined and therefore does not cause any subsidence problems.

The Mercia Mudstone is typically underlain by the Sherwood Sandstone, which also occurs at the surface between the Mercia Mudstone and the adjacent coalfield areas. In contrast to the Cheshire-Shropshire area, the Sherwood Sandstone here includes many beds of pebbles, the proportion of which diminish northwards. It is of variable thickness, but broadly thins towards the east. Around Worcester it is up to 2500 m thick, up to 1000 m east of Birmingham, 500 m in the Stafford and Redditch areas, 200 m west of Burton upon Trent and around 30 m thick in the Warwick-Tamworth area. The Sherwood Sandstone is a very good aquifer in these areas, with water abstracted from both the outcrop areas and where they lie at relatively shallow depths beneath the overlying Mercia Mudstones. Below about 500 m depth however the water is not generally of drinking quality. A limited amount of exploration for oil and gas has been undertaken in the Worcester area, but nothing has been found. However, the boreholes associated with this exploration have helped significantly with the understanding of the deep geology and structure.

Within the down-faulted basins the older sedimentary bedrock layers including the Coal Measures, together with basement rocks are found at considerable depths usually in excess of 1-2 km. Within the up-faulted blocks these strata are present at, or close to the surface. The five major up-faulted blocks include the coalfields around Stoke-on-Trent, a strip from Kidderminster northwards to Telford, between Birmingham and Wolverhampton, from around Coventry northwards to Tamworth and between Burton upon Trent and Coalville. The Coal Measures have been extensively mined for coal and iron ore (Plate P211735) in most of these locations and they show wide variations in thickness but generally in the range 200-400 m. The thickest development is in excess of 1300 m around Stoke-on-Trent. These rocks comprise a repetitive sequence of sandstones and mudstones with ironstones and coals. These are commonly overlain by younger layers dominated by red mudstones and sandstones (Warwickshire Group). These mudstones represent a significant brickclay resource and have been extensively quarried at the surface. Again, these red beds show wide variations in thickness, with a maximum of around 1500 m in the Potteries.
Limestones around 350 to 330 million years old also occur in the blocks in several locations (Figure P542174). Older sedimentary bedrocks are also found in the area west of Bridgnorth. These comprise mainly red mudstones with layers of sandstone and limestone. Their combined thickness is estimated to be around 1100 m. These rocks also underlie large parts of the area between Telford, Bridgnorth, Kidderminster and Birmingham at depths of up to 1000 m.

**Baseline rocks**

Some of the oldest rocks known in England, up to 600 million years old, occur in Charnwood Forest, Leicestershire (Plate P581676), forming an easterly extension to the Burton upon Trent - Coalville up-faulted block. The rocks are composed of volcanic tuffs, sandstone and mudstone derived from the erosion of nearby volcanoes and these rocks are very significant as they were the first in the world to yield fossils of this age; their extent at depth is not known. Also within Charnwood Forest, a number of small intrusions of solidified magma are present. Gravity and magnetic data suggest that a number of these masses link up at shallow depth into a large body. Small surface exposures of other basement rocks occur at Nuneaton, near Wellington, to the north of Redditch, and around Walsall and Dudley. In the Warwickshire Coalfield the basement rocks of around 500 to 480 million years old occur at depths as shallow as 600 m, comprising grey mudstones deposited in deep seas. The eastward extent of these is not known in detail. Coarse grained intrusions of solidified magma are present at the surface in places southwest and northwest of Leicester (Figure P581675). They are linked at shallow depths of up to 500 m and are related to intrusions found in the Eastern area.