The centre of Sheffield is expressing a new confidence in itself as it is remodelled to greet the 3rd Millennium. This walk starts in the stone-rich Peace Gardens and ends at the Cutlers' Hall, symbol of Sheffield's continuing industrial heritage.

On the 900m walk, local sandstones may be contrasted with exotic granites and marbles, ranging in age from 1500 million years to less than 2 million. You may judge for yourself how many of these building stones would withstand a further 2 million years under the onslaught of Sheffield's weather and city life.

Most of the walk is in a traffic-free zone.

The Peace Gardens (2) have recently been redesigned to complement the late Victorian architecture of the **Town Hall (1)** and to provide an area for contemplation. What better place to start!

Although Sheffield is surrounded by sandstone hills, the building stones of the **Town Hall** (cover photo) come from a little further afield. The exterior is constructed of pale brown sandstone from Stoke Hall Quarry at Grindleford. The sandstone, from rocks of the Millstone Grit Series, was formed during the Carboniferous Period (320 million years ago). At this time, Britain lay near the Equator and from time to time was covered by deep, fast flowing rivers. A close look at the stone shows its uniform texture and absence of cracks, which helps it to resist the attack of the weather and industrial pollutants. It has also allowed the intricate carving of the frieze on the front, showing Sheffield's traditional crafts. Such a building stone is known as a freestone.

Approaching the Peace Gardens from the Town Hall, the designers have chosen a matching sandstone from the same quarries for the carved balustrade (photo A).

A stronger rock was required for the paved areas, and most of the large flagstones are a type of sandstone known as 'Rockingstone', from Johnson Wellfield's quarries near Huddersfield. The rock formation from which they come is appropriately named the Rough Rock, but the rough top surface on these slabs is produced at the quarry. The stone is sawn, and as the saw blade cuts through the stone, pellets of cast iron shot are dragged through the slot, resulting in the rough surface with its irregular markings. Some of the slabs show round orange blobs and lines, where iron minerals had already been weathered by oxidation before the stone was quarried (photo B). An even stronger sandstone, from Johnson's Crosland Hill quarries is used for the steps in the Peace Gardens.

Some of the paving on the approaches to the Peace Gardens consists of granite cubes, or **setts**, embedded in a cement/sand slurry (photo C). The skills involved in laying these setts had to be relearned after a lapse of a century or so. The rock types include pink, red, pale grey and dark grey granites from Spain and Portugal. A 'blue' granite, the Alantejo Granite, from Portugal has been used for the kerbstones on Pinstone Street.

The flat bench seats are made from a dark grey, banded rock known to the masons as 'Khuppiam Green Granite', from India. The banding and coarse size of the crystals in the slabs show that it is really a metamorphic rock, formed deep in the Earth's crust under high pressures and temperatures. This is called a **gneiss** by geologists (photo D).

In the Peace Gardens themselves, the large plaques 'in celebration of the second millennium' and in memory of the Spanish Civil War are carved from another metamorphic rock. In this case the rock originated as volcanic ash falling into a huge lake, about 460 million years ago, but it too became heated and squeezed in the Earth's crust until it became a slate, which is much harder and resistant to weathering. It comes from Broughton Moor Quarry, in the Lake District.

FOOTNOTE

An activity trail sheet for young people may be obtained from Sheffield Tourist Information Centre, Peace Gardens; Sheffield City Museum; 'Sheffield Scene', Surrey Street, during the British Association meeting from 13th to 17th September 1999 and during the Millennium celebrations. A more detailed book on the buildings of Sheffield is being prepared by the Sorby Natural History Society and Sheffield City Museum.

The paving which forms the base of the fountain forms a grid pattern. One part of the grid is formed of sedimentary rocks:

- Rockingstone sandstone, from Huddersfield
- Clashach Sandstone from near Lossiemouth in Scotland
- Red Wilderness Sandstone from the Forest of Dean.

The other part is formed of metamorphic and igneous rocks:

- Broughton Moor Green Slate (photo E).
- Transvaal Red Granite from South Africa
- 'Blue Pearl' Larvikite – a blue igneous rock from Norway.

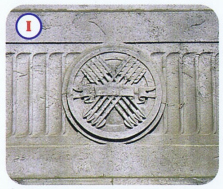
On the south side of the Peace Gardens, **St Paul's Parade (3)** contains a row of shops built from a range of different materials. **Laura Ashley** on the corner with Pinstone Street shows the results of an ill-advised attempt to clean the frontage with acid. The upper storeys are of a red man-made material, terra cotta, now streaked with acid marks. The ground-level walls are clad in a very coarse granite (photo F). The colour is badly bleached by the cleaning agents, but it is probably Peterhead Granite, from East Scotland, which may be seen in more pristine condition later (Location 11).

The red theme is continued in **the rest of the Parade.** The building stone is a red sandstone of Triassic age (245 million years). At first, one red sandstone looks much like another, but if a little water is rubbed into the surface, it produces a deep chocolate hue, which is characteristic of the St Bees Sandstone, from the fringe of the Lake District. This sand was deposited under semi-arid conditions and modern wind erosion has etched out the original current-bedding planes in the sand, resulting from the time when it formed in swollen rivers. Some blocks are upside down in relation to their original position in the quarry (photo G).

Turn left and walk along Norfolk Street past the Peace Gardens. Turn right into Surrey Street and find **'The Surrey' public house (4).** The carved symbols on the walls show this to have been a former meeting place of the Freemasons. It takes a little practice to distinguish between the natural gritstone blocks of the walls, the brickwork covered in cement rendering, and the Portland Stone door frame, now badly discoloured. Some of the gritstone blocks have been 'scabbled' by the masons, which is pretty but obscures the geology.

The simply cut blocks show the coarse sandy nature of the gritstone, and many blocks display current- bedding, where water currents moved the loose sand grains along and deposited them in underwater dunes, a little like the ones of St Paul's Parade, but usually more regular (photo H).

The City Library (5) opposite, was built in the 1930s of Portland Stone, formed in the Upper Jurassic (150 million years ago). This freestone from Dorset is particularly well known because it was popularised by Sir Christopher Wren. It is a limestone composed of tiny spheres of calcium carbonate. Such limestones are forming today on the shallow sea bed near the Bahamas and show that England must have been in warmer latitudes then. Proof of its marine origin comes from the shelly remains of sea creatures such as oysters which can be seen weathering out of the wall (photo I). Although this is a limestone in an industrial city, it seems

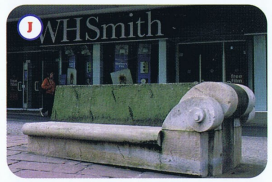


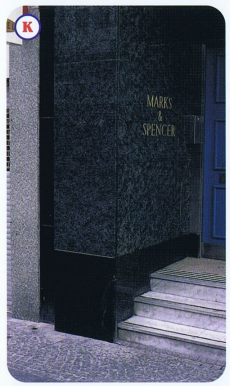
to be standing up to the weather very well.

The entrance porch is finished in cream coloured travertine. This is a very different form of limestone, formed where hot water bubbled up from springs and left deposits of lime, rather like the scale in a kettle. It is also much younger, up to 2 million years old.

Walk across Tudor Square and along Norfolk Row to **Fargate (6).** The street itself was refurbished in 1997/8 and a wonderful variety of stone has been used. The map shows the main features and it is probably best to browse up and down at will, studying the paving and street sculptures first and saving the shop fronts for later.

At the southern end there are some **bench seats** made from the same gneiss as at the Peace Gardens. The next set of seats is carved from Ancaster Limestone, from Lincolnshire with a core of local gritstone. The Ancaster stone is of Middle Jurassic age (170 million years) and ranges in colour from blue to brown and pink. The reddest variety is not noted for its resistance to weathering and it will be interesting to see how the different coloured stones respond in this long term 'controlled experiment' in Fargate (photo J). Some of the **paving in Fargate** (see map) is the same as around the Peace Gardens, namely a range of imported granite setts and slabs, laid by Italian craftsmen and intended to take the weight of delivery lorries. The sedimentary rocks forming the paved walkways, however, are British rocks. The green-brown sandstone setts and flagstones are from the Yorkshire Greenmoor Rock; some are recycled from earlier pavings. The dark grey flagstones are from the Caithness Flags, a very close-grained, hard sandstone which can be readily split, or riven, along the bedding planes with a hammer and chisel. The riven surfaces of the flagstones provide a non-slip walking surface.





The reddish coloured slabs in the middle of Fargate are from the Penrith Sandstone, near Lazonby in Cumbria. This is similar to the St. Bees Sandstone noted on St. Paul's Parade, but with more resistance to wear and tear, because the sand grains are naturally cemented together by silica rather than by iron minerals or carbonates.

Although you have had your head down so far, it is worth looking closely at the shop front of **Marks and Spencer (7).**

The walls at each end of the store and above the windows are clad in two different rocks. The lighter coloured one is a granite, probably from Devon or Cornwall and shows the three main minerals of granite, i.e. white rectangular feldspar, shapeless grey quartz and shiny black biotite mica. The random arrangement of these crystals shows that they crystallised from a molten state.

The darker, coarse-grained rock which looks igneous, is in fact, of metamorphic origin. It contains a rather attractive blue-grey mineral called cordierite and is known as 'Verde