

### The Sewalik (Siwalik) Hills

The Sewaliks are the low outermost foothills of the Himalayas. In present-day India and Pakistan they characteristically occur at Hardwar north of Saharanpur, in the Jammu Hills, and Potwar south of Rawalpindi.

- 18-11 million years ago the Sewalik basin developed by the sagging of the crust immediately to the south of the rising Himalayan mountain chain. Sand and clay eroded from the mountains was swept down by rivers and deposited in the Sewalik basin. Animals living at the time included the ape *Sivapithecus*, a giant hornless rhinoceros *Baluchitherium*, and a giant tortoise.
- 9-7 million years ago the emergence of the lofty Himalayas changed wind circulation, and a low pressure system was established in northern India. This drew in moisture-laden air from the Indian Ocean – and the southwest monsoon was initiated.
- 5.1-1.6 million years ago in the Sewalik area, lush grasslands watered by the monsoon attracted mammals, with hippopotamus, elephant and horse migrating here from other continents. Their bones and teeth were preserved as fossils in the Sewalik rocks.
- About 1.6 million years ago tectonic uplift folded and faulted the Sewalik rocks.
- 850,000 years ago tectonic action further uplifted the Himalayan area, with glaciation in the higher mountains.
- 27,000 – 7,000 years ago sediments deposited in parts of the Sewaliks formed flat areas known as 'duns', e.g. Dehra Dun.

(Information from 'Himalaya' by K S Valdiya, UP (India), 2001)

### Fossils from the Sewalik Hills

View specimens of 2 million year old fossils from the Himalayan foothills. What do they tell us about this area 2 million years ago? How did they get to Ipswich Museum? What animals do they represent?

Hippopotamus. Tooth in jaw. Hippos migrated to the Sewalik area from Africa about 5.3 million years ago, the generations travelling through Arabia and Iran.

Elephas planifrons. Molar tooth of an elephant. The grinding surface of this early elephant shows thick enamel ridges. These elephants migrated to the Sewalik area from Africa about 3.6 million years ago.

Horse. Cheek teeth. Horses migrated to the Sewalik area from Alaska (North America) about 2.5 million years ago, the generations travelling through central and west Asia.

Gazella. Bony core from inside horn of an early form of gazelle. Horns are not shed; both male and female animals have them.

Hyaena. Portion of lower jaw.

Sivatherium. Upper tooth of an antlered, hoofed mammal related to the giraffe.

Gharial. Portion of jaw.

Who collected the Sewalik specimens?

The gazelle, horse and elephant fossils were collected by Sir Proby Thomas Cautley (1802-1871). He was born in Suffolk, and joined the Bengal artillery in 1819. He was then involved in the construction of canals in India, including the Sewalik Hills where he collected numerous fossils and wrote major papers on them. Most specimens went to the Calcutta Museum and to the British Museum. Sir Proby died at Sydenham near London, most of the remainder of his collection passed to Miss Catharine Cautley of Chelworth, Suffolk, who presented them to Ipswich Museum in 1878.

Other specimens may have been collected by Sir William Erskine Baker (1808-1881), the family dispersing his specimens in 1948.

### Other Specimens from India

Flexible sandstone (from Jind). This rock bends under its own weight! Grains of the mineral feldspar have decomposed, leaving a mass of loosely interlocking grains of quartz, allowing a certain amount of flexibility. (Ipswich Museum collection)

Specimens from Agra (Collected by Bob and Caroline Markham)

Sandstone for the Red Fort. Red sandstone being used in repair work at the Red Fort in Agra in 2004. Obtained from the workmen on site.

The Red Fort, Agra. The red sandstone walls of Agra Fort conceal marble pavilions, landscaped gardens and mosques. (Postcard c. 1917)

Makrana Marble. A 'crystalline limestone' from Makrana (Mekrana) near Jodhpur. The celebrated Mogul buildings of Delhi and Agra, including the Taj Mahal, use this rock. This piece was obtained from a workshop close to the Taj Mahal in Agra.

The Taj Mahal, Agra. The white marble is from Makrana in Rajasthan; close inspection shows it to include grey and brown streaks, with some blocks showing fine crystalline structure. Yellow marble and rockspars came from the banks of the Narmada River, black marble from Charkon and red sandstone from Sikri. The inlay work used crystal and jade from China, lapis lazuli and sapphires from Sri Lanka, jasper from Punjab, carnelian from Baghdad, turquoise from Tibet, agates from Yemen, corals from Arabia, garnets from Bundelkhand, India, and onyx and amethyst from Persia. (Postcard c. 1917)

Lattice-work candle-holder made of Makrana Marble. This was bought from a shop close to the Taj Mahal in Agra. The inlay work done in modern Agra workshops uses lapis from Chile (formerly from Afghanistan), malachite from Zambia (formerly from Russia), also carnelian, jasper, turquoise and coral.

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