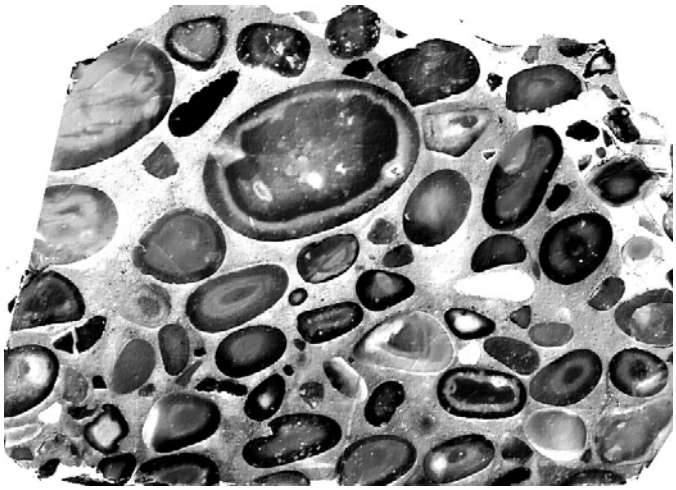
Hertfordshire Puddingstone.



What it is.
It is a type of conglomerate. Conglomerates are deposits composed of pebbles or boulders embedded in a finer-grained matrix such as silt or sand and converted to rock by natural cementing. It has the following distinctive properties.

1. Its pebbles are composed of flint, and are very well rounded.
2. The flint is brown, or a deep red colour (jasper), or has parts of both colours.
3. The pebbles often have black exteriors, which show as thin rinds on cut or polished surfaces.
4. The cementing material, which binds the sand and pebbles, is chemically similar to the flint of the pebbles. Both are composed of silica. The result is that the rock is uniform and breaks straight across the pebbles.

How to distinguish it from concrete.
Concrete is made from stone fragments, termed ‘aggregate’, in a matrix of Portland cement. For the ‘aggregate’ component, flint pebbles, mechanically sorted from local gravels, are often used. Such concrete and Hertfordshire Puddingstone can be easy to confuse. However there are the following differences.

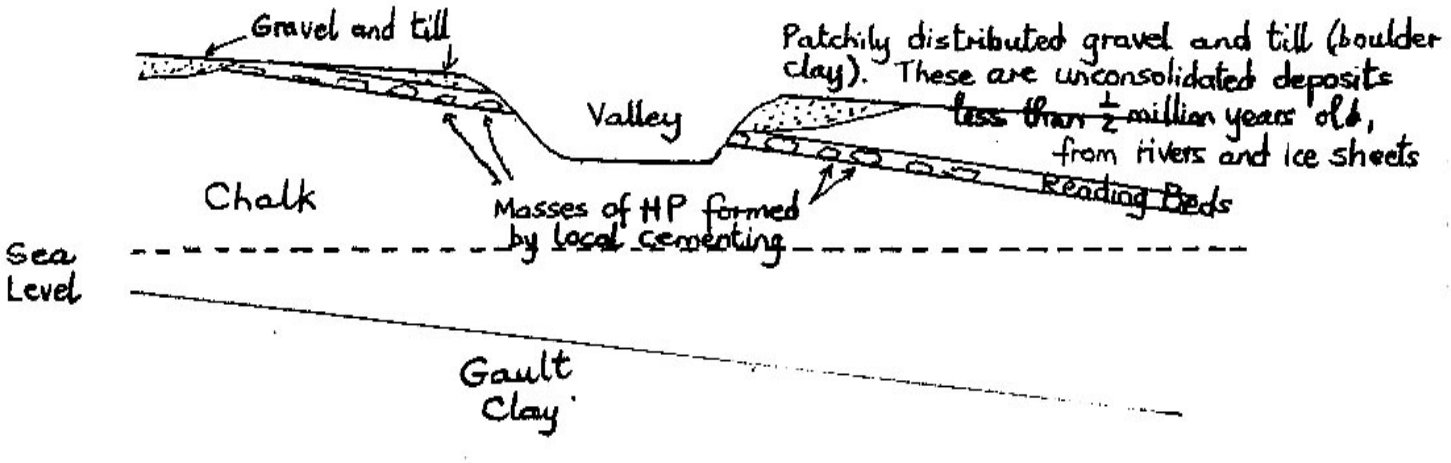
1. In concrete the matrix material will be opaque white, in puddingstone variations of pale brown and grey.
2. The fine-grained concrete matrix is softer than the pebbles, and can be scratched with a penknife.
3. Concrete breaks irregularly, not smoothly across matrix and pebbles, as Hertfordshire Puddingstone usually does.

How it is related to Stonehenge
Rock similar to the sand matrix of Hertfordshire Puddingstone, and with similar silica cement, but lacking the pebbles, occurs further west in Southern England, and is called **Sarsen** stone. Stone Age man used large blocks of it for the Trilithons of Stonehenge and the stone circles and avenue at Avebury (Wiltshire). Closer to home, it has been used in the walls of Windsor Castle, and there are kerbstones in Hertford made from it. Hertfordshire Puddingstone itself can have layers in which the pebbles are sparse or, like the Sarsen stone entirely absent.

Another local type of conglomerate.
In some areas north of London, flint pebbles in river gravels have locally been bound together into large coherent masses by hydroxides of iron (essentially rust), deposited by circulating water. Such material has been used for building in the past, and can be seen near the Abbey at Waltham Abbey in walls that originally were monastic buildings. It is sometimes referred to as puddingstone, but is not Hertfordshire Puddingstone, and is much younger.

How Hertfordshire Puddingstone occurs

It occurs within the Reading Beds, which are composed of pebbles and sand, and lie between the Chalk and London Clay geological layers. It forms blocks of rock that can be as much as 6 meters across and 1 meter thick, which have developed from the Reading Beds material by localised cementing.



Hertfordshire Puddingstone is often found in gravel pits, in places to which it has been moved by ice sheets during glacial periods. However, it did not actually form at that time as is sometimes thought.

How it was formed.

The history of the flint pebbles starts about 80 million years ago. At that time dinosaurs were the main large land animals, North America was close to Europe and the north Atlantic had not yet opened. The sea covered much of Britain, and fine white sediment, which later became the Chalk, was deposited on the seabed. Within the Chalk flint formed chemically as hard irregular lumps.

Britain was then uplifted and became land. Rivers eroded part of the Chalk away. Eventually the sea returned. Its action washed the soft white Chalk away, but left the lumps of flint. The lumps were broken, rolled and ground by the waves until they had been reduced to the smooth round pebbles that form the 'plums' in the puddingstone. You can see the same process in action on most modern beaches.

At that stage the flints would still have been grey or black, like the flints that can still be seen in the Chalk, and before being made into the puddingstone they must have developed their colours, which are due to compounds of iron. Prolonged contact with water that contained iron compounds would have turned them brown, and they may have been on the floor of a lake or lagoon, where such water was present. The red jasper colour indicates subsequent heating, implying exposure to a hot sun. In those days Britain was further south. If a lake or lagoon existed, fluctuations in its level could periodically expose the pebbles to the sun. The origin of the black rinds, although also due to an iron compound, is in doubt.

Next the pebbles were washed into the fine sand that became their matrix. Then came the patchy cementing of the Reading Beds, due to silica carried by percolating water. Where the silica came from is also in doubt. In most explanations the cementing occurred before the sea flooded in again, and the London Clay was deposited on top.

So, we know about moving continents, and the age of the Earth but, as this complicated, but incomplete story shows, the details of how our local stone was formed still elude us.

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August 2005.

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