

### FGS FIELD TRIP

6 October & 20 October 2024

The **Devil's Punch Bowl** lies at the western end of the Lower Greensand outcrop and when you stand on the 'road' at the top of the 'punchbowl' itself, you will be looking approximately north giving a good view of:



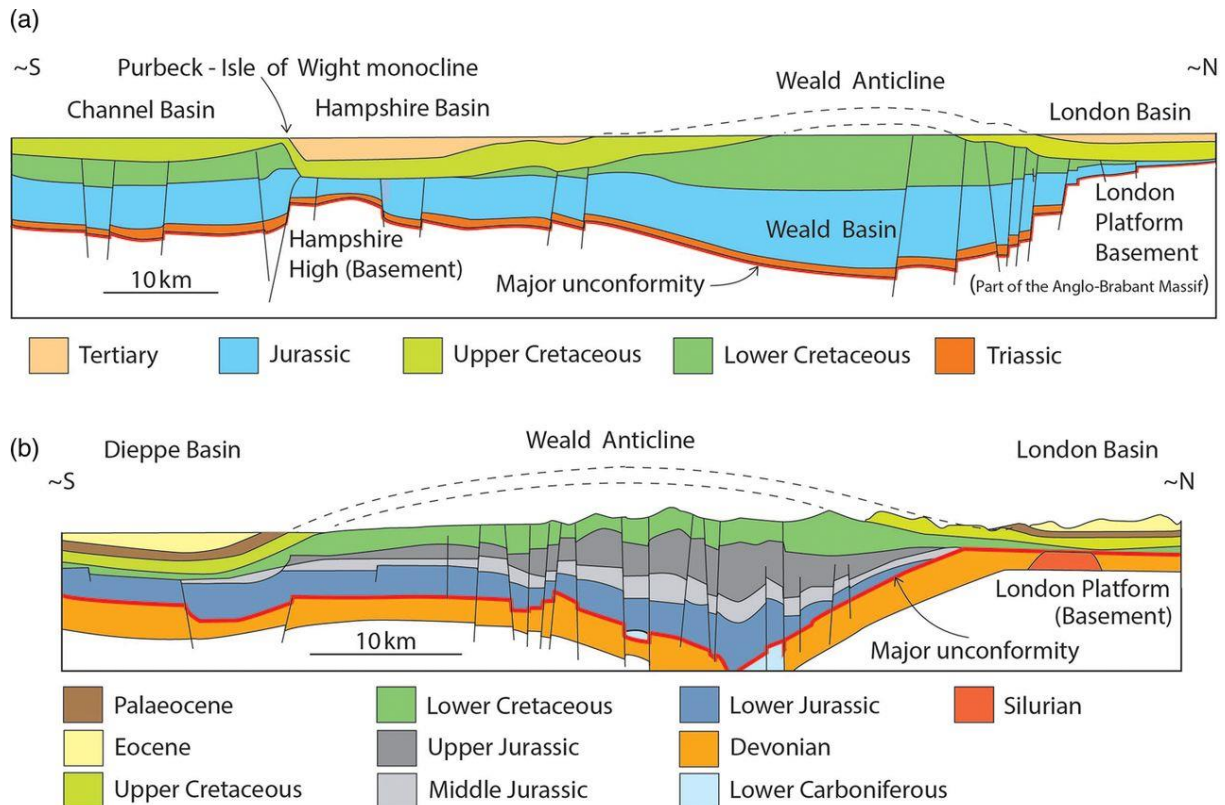
Map Credit: BGS

1. **Lower Greensand Group (Hythe Fm)** ... the rocks you are standing on and the heavily tree-lined slopes along the edge of the bowl.
2. The **Atherfield Clay Fm** ... low flattish ground at the base of the bowl.
3. Views across the **Gault (Clay) Fm** valley to the ...
4. Subvertical **Chalk** beds of the North Downs Hogs Back, which forms the ridge in the distance.
5. The **Upper Greensand** is not visible but outcrops near Seale (at the western end of the area of view - Hogs Back) between the Gault Clay and the Chalk.

The Wealden Basin extends into France and lies to the South of the hard, mainly Precambrian, crystalline basement rocks of the London-Brabant Massif - a structural high that stretches from W Germany through N Belgium, North Sea, East Anglia and Thames Estuary and continues west as far as Wales.

The Wealden Group lie in the core of an eroded anticline which formed during the Tertiary Alpine orogeny as Africa drifted N into Europe and the UK/Eire islands. However, its history goes back to the Variscan Orogeny, when the Wealden area was part of a low fold belt on the N edge of the main orogeny but it collapsed in the Triassic, forming the deep Weald and Wessex Basins where thick sequences of sediments accumulated through the Jurassic, Cretaceous and Early Tertiary. Then during the Alpine orogeny, the basin was compressed forming the Wealden Anticline – a classic example of structural inversion with a total uplift of more than 1500m. Today it forms a complex fold structure with a maximum elevation of 1400m at Ashdown Forest.

## The Devil's Punch Bowl – Lower Greensand beds



Ref: Cosgrove, J.W., *The deformation history of southern England, and its implications for ground engineering in the London Basin*; *Quart. Jour. of Eng. Geol. & Hydrogeol.*, 55, qjegh2020-144. <https://doi.org/10.1144/qjegh2020-144>

### Why the Devil's Punch Bowl?

Legend has it that the Devil lived at the 'Devil's Jumps', near Churt. He would torment Thor, God of Thunder, who lived at Thor's Lie (Thursley), by jumping from hill to hill. Thor would try to strike the Devil with thunder and lightning and once scooped up a handful of earth and hurled it at the Devil. The depression that remained is the Devil's Punch Bowl.

**Sir Arthur Conan Doyle**, author of *Sherlock Holmes*, used to walk on Hindhead Commons and it's said that he used Hindhead as the inspiration for the book '*The Hound of the Baskervilles*'.

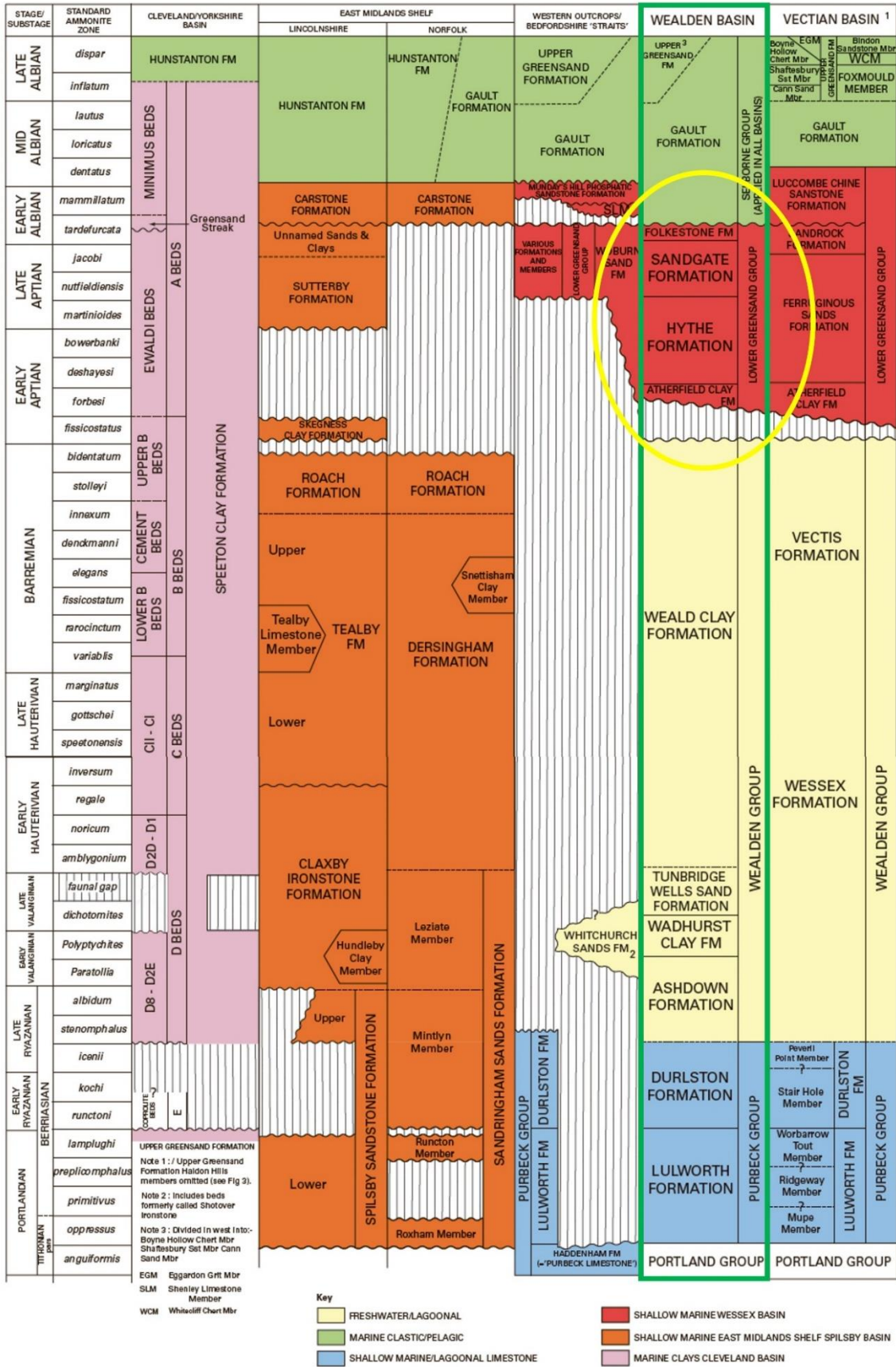
### A brutal murder

In 1786 a sailor was brutally murdered by three men which he had befriended (in a local pub in Thursley) whilst walking from London to the docks in Portsmouth.

Soon after the murder a stone was erected to mark the spot where the poor sailor met his death. The three villains were tried and then hung on Gibbet Hill, near the site of the murder, as a warning to other criminals.

After the hanging many fears and superstitions arose around Gibbet Hill and in 1851 Sir William Erle, an English lawyer, judge and Whig politician, paid for a Celtic cross to be erected to banish these fears and raise the local spirits.

# The Devil's Punch Bowl – Lower Greensand beds



Ref: Hopson, P M, Wilkinson I P and Woods, M A. A stratigraphical framework for the Lower Cretaceous of England. 2008, BGS Research Rept., RR/08/03. Table 7: overview of the Lower Cretaceous.

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## The Devil's Punch Bowl – Lower Greensand beds

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The following is summarised from the "The BGS Lexicon of Named Rock Units", available online at <https://www.bgs.ac.uk/technologies/the-bgs-lexicon-of-named-rock-units/>.

### Seaford Chalk Formation

*Coniacian to Santonian*

#### **Lithological Description:**

Firm white chalk with conspicuous semi-continuous nodular and tabular flint seams. Hardgrounds and thin marls are known from the lowest beds. Some flint nodules are large to very large.

#### **Thickness:**

Generally, in the range 50 to 80m in the basinal successions of Sussex and Hampshire within the Southern Province.

#### **Geographical Limits:**

Known throughout the Southern Province, within the Chilterns and northward into East Anglia in the Transitional Province.

### New Pit Chalk Formation

*Turonian*

#### **Lithological Description:**

Principally blocky, white firm to moderately hard chalk with numerous marls or paired marl seams. Flint occurs sporadically in the upper part in the deeper basin areas of the Southern Province.

#### **Thickness:**

Typically, between 35 and 50m but is as little as 10 to 25m thick in Wiltshire, north Hampshire and Berkshire over synsedimentary structural highs.

#### **Geographical Limits:**

Known throughout the Southern Province, within the Chilterns and northward into East Anglia in the "Transitional" Province. A number of laterally persistent and named marl and flint beds in Mortimore (1986) can be recognized over much of southern England.

### Upper Greensand Formation

*Albian to Cenomanian*

#### **Lithological Description:**

Sand and sandstone, fine-grained, silt, glauconitic, shelly.

#### **Thickness:**

0 to 75m

#### **Geographical Limits:**

Eastbourne to Sevenoaks in the Weald; across the Wessex Basin and northwards to just northeast of Monks Riseborough in the Chilterns.

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## The Devil's Punch Bowl – Lower Greensand beds

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### Gault Formation

*Albian*

#### **Lithological Description:**

Pale to dark grey or blue-grey clay or mudstone, glauconitic in part, with a sandy base. Discrete bands of phosphatic nodules (commonly preserving fossils), some pyrite and calcareous nodules.

#### **Thickness:**

90 to 110m in the Weald.

#### **Geographical Limits:**

Extensive outcrop in eastern England from Norfolk, southwestwards across the East Midlands and Home Counties to Devon, in the Isle of Wight and around the margins of the Weald.

### Folkstone Formation

*Aptian to Albian*

#### **Lithological Description:**

In Sussex, Kent and Surrey the formation comprises medium- and coarse-grained, well-sorted cross-bedded sands and weakly cemented sandstones; elsewhere includes calcareous sandstones. There are no formal divisions in the Weald, but equivalent beds in the west are termed the Child Okeford Sand Member and the Bedchester Sands Member.

#### **Thickness:**

Between 0.5 and 80m.

#### **Geographical Limits:**

West Sussex and southeast Hampshire; otherwise circum-Weald.

### Sandgate Formation

*Aptian*

#### **Lithological Description:**

Fine sands, silts and silty clays, commonly glauconitic; some sands limonitic or calcareous; some soft sandstones.

#### **Thickness:**

50 to 100m in West Sussex.

#### **Geographical Limits:**

The Weald of Kent, Sussex, southeast Surrey and eastern Hampshire.

### Hythe Formation

*Aptian*

#### **Lithological Description:**

In the western Weald, the formation comprises mainly fine- to medium-grained, sparsely glauconitic sands, sandstones and silts, locally pebbly, with calcareous or siliceous cement in beds or lenses in some areas. Some clay interbeds, including *Fuller's Earth*.

#### **Thickness:**

18 to 100m.

## The Devil's Punch Bowl – Lower Greensand beds

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### **Geographical Limits:**

As an arcuate outcrop around Weald of Kent, Surrey and Sussex. In the subcrop as far north as the London-Brabant ridge.

**Fuller's Earth** is a claystone that contains a high proportion of smectite clay minerals (particularly montmorillonite). Formed by the alteration of volcanic ash deposited in seawater.

### **Atherfield Clay Formation**

***Aptian***

### **Lithological Description:**

Generally massive yellowish brown to pale grey sandy mudstone throughout most of its outcrop, with an impersistent phosphatic pebble bed with vertebrate bones, gritty sandstone or very shelly sandy mudstone with glauconite, at the base. Weathers to a chocolate brown, bluish grey and brown, mottled pinkish brown to orange.

### **Thickness:**

In the Weald, the formation is 18m thick in West Sussex and Surrey and thins eastward to about 10m.

### **Geographical Limits:**

The formation occurs at outcrop in the Weald of Kent, Surrey and Sussex and on the Isle of Wight.

### **Weald Clay Formation**

***Hauterivian to Barremian***

### **Lithological Description:**

Dark grey thinly-bedded mudstones (shales) and mudstones with subordinate siltstones, fine- to medium-grained sandstones, including calcareous sandstone, shelly limestones and clay ironstones.

### **Thickness:**

Up to 460m around Guildford.

### **Geographical Limits:**

The formation crops out in the Weald. Known in the subcrop but thins and is cut-out against the Hampshire-Dieppe High in the south and the London-Brabant Ridge in the north. Disappears westward in the subcrop of the Wessex Basin.

### **Some Useful References:**

- Local Walks: <https://www.haslemere.com/vic/pdf/2020/devilspunchbowlwalk.pdf>
- NT Devil's Punch Bowl: <https://www.nationaltrust.org.uk/hindhead-commons-and-the-devils-punch-bowl>
- [https://en.wikipedia.org/wiki/Devil%27s\\_Punch\\_Bowl#:~:text=This%20deep%20depression%20is%20believed,The%20site%20has%20abundant%20wildlife.](https://en.wikipedia.org/wiki/Devil%27s_Punch_Bowl#:~:text=This%20deep%20depression%20is%20believed,The%20site%20has%20abundant%20wildlife.)
- LOUGS Field Trip 2015 <https://ougs.org/london/event-reports/646/field-trip-the-devils-punchbowl/>