



Harrow and Hillingdon Geological Society  
present

# Rock Show 2018

at

## Uxbridge Main Library

Friday 9<sup>th</sup> February - Thursday 22<sup>nd</sup> February 2018

during library opening hours

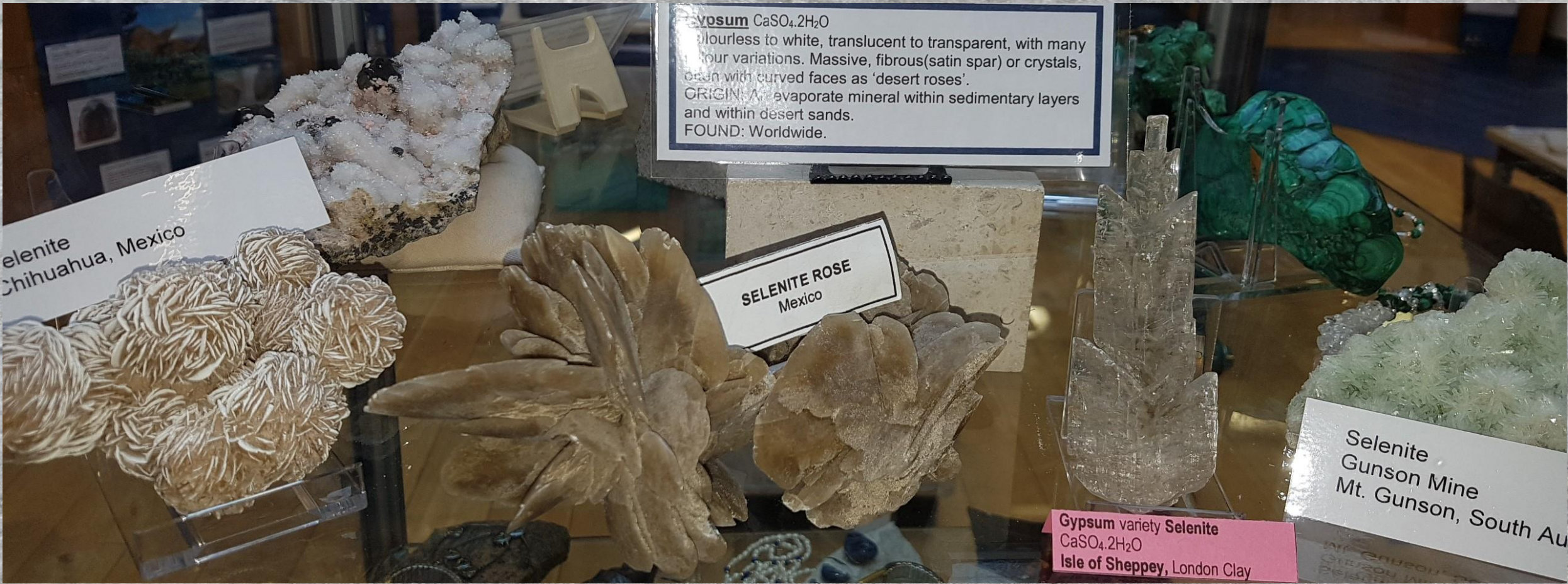
**THE SOCIETY ALWAYS WELCOMES NEW MEMBERS, WHATEVER THEIR KNOWLEDGE OF THE SUBJECT.**



# What can we do with rocks?







**Gypsum**  $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$   
Colourless to white, translucent to transparent, with many  
four variations. Massive, fibrous (satin spar) or crystals,  
often with curved faces as 'desert roses'.  
ORIGIN: An evaporate mineral within sedimentary layers  
and within desert sands.  
FOUND: Worldwide.

Selenite  
Chihuahua, Mexico

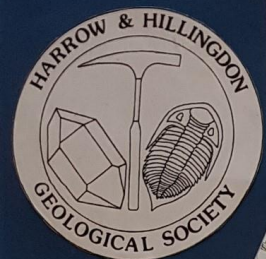
SELENITE ROSE  
Mexico

Gypsum variety Selenite  
 $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$   
Isle of Sheppey, London Clay

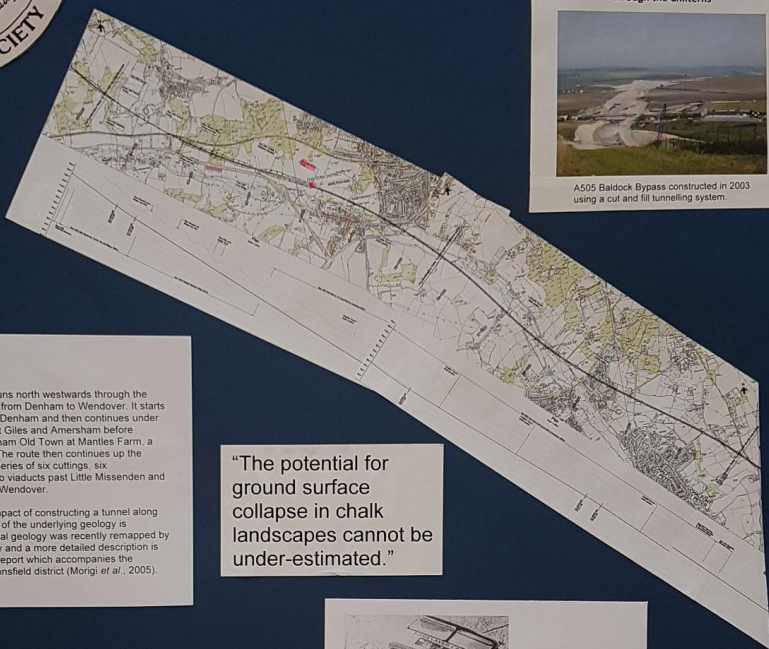
Selenite  
Gunson Mine  
Mt. Gunson, South Au

**How do crystals form such weird  
and wonderful shapes?**





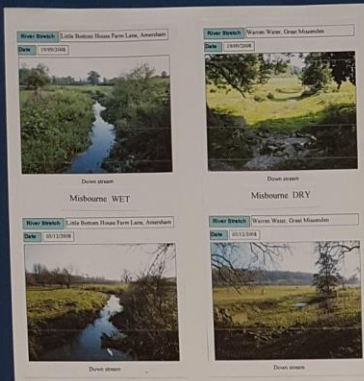
# HS2 THROUGH THE CHILTERN CHALK?



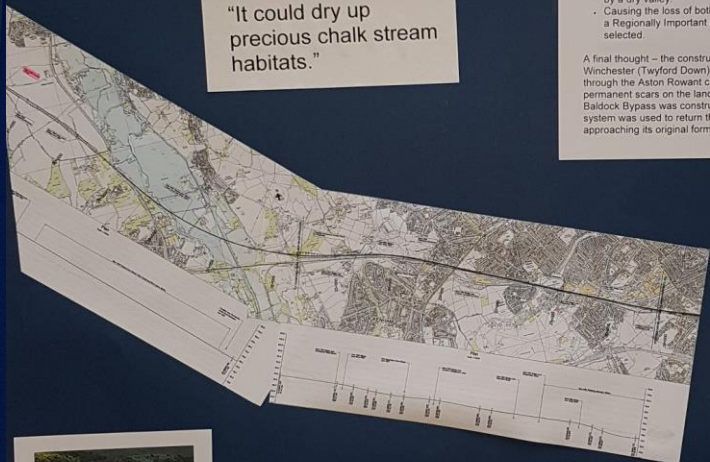
Concerns arising from the Geology and Hydrology of the ground underlying the High Speed (HS2) routes through the Chilterns



A505 Baldock Bypass constructed in 2003 using a cut and fill tunneling system.



"It could dry up precious chalk stream habitats."



"13 million litres of water could be lost per day."

## Conclusions

The Chalk which constitutes the core of the Chiltern Hills is between 100 and 84 million years old. It provides the foundations onto which the surface habitats, landscapes and ecosystems which comprise the Chilterns Area of Outstanding Natural Beauty have developed.

This landscape was last modified naturally about four hundred and fifty thousand years ago during the Anglian ice age. The ice sheets formed at this time reached as far south as the Vale of St Albans, dammed the proto-Thames river which was, until then, flowing eastwards towards the North Sea and depositing the sand and gravel terraces which we see exposed today in road cuttings (e.g. M25) and gravel pits across the region.

This geological history has directly impacted onto the underlying rock succession which is a critically important but vulnerable aquifer in an area of high and still growing population density. The HS2 construction will cut through this underlying foundation, which ever route is followed.

All the routes indicated will require extensive construction via tunnels and deep cuttings in order to cross the Chilterns and access the Vale of Aylesbury to the north. It will be impossible to do this without:

- Potentially causing long term damage to the Chalk aquifer system (this applies to all three proposed routes).
- Causing pollution of the main water supply system for the north western Home Counties area and potentially further into north London - with the subsequent need to source water from other, much more distant parts of the country.
- Running the risk of serious ground collapse in areas with deep sections of weathered chalk.
- Depressing the water table in the Misbourne valley, resulting in -
  - the total loss of surface flow in the Misbourne River system and the destruction of the adjacent habitats.
  - the aesthetic loss of the Misbourne River and its replacement by a dry valley.
  - Causing the loss of both biological and geological SSSI's and a Regionally Important Geological Site should Route 4 be selected.

A final thought - the construction of the M3 through the chalk at Winchester (Twynford Down) and the construction of the M40 through the Aston Rowant cutting through the Chilterns have left permanent scars on the landscape. As a result, when the A505 Baldock Bypass was constructed in 2003 a cut and fill tunneling system was used to return the landscape to something approaching its original form.

## Proposed Route

The proposed HS2 Route 3 runs north westwards through the valley of the River Misbourne from Denham to Wendover. It starts as a tunnel under the M25 at Denham and then continues under Chalfont St Peter, Chalfont St Giles and Amersham before emerging just west of Amersham Old Town at Mantles Farm, a total distance of about 9km. The route then continues up the Misbourne Valley through a series of six cuttings, six embankments and across two viaducts past Little Missenden and Great Missenden through to Wendover.

In order to understand the impact of constructing a tunnel along this route, a brief description of the underlying geology is presented below. The regional geology was recently remapped by the British Geological Survey and a more detailed description is provided in the explanatory report which accompanies the published map for the Beaconsfield district (Morigi *et al.*, 2005).

"The potential for ground surface collapse in chalk landscapes cannot be under-estimated."

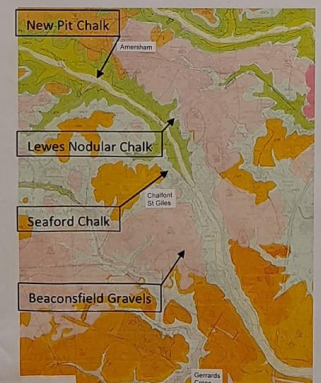
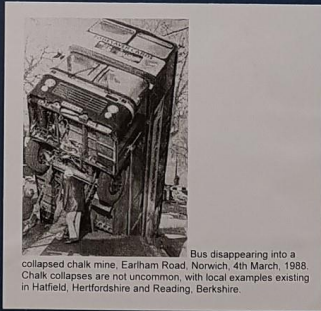


Figure 1: Geological map of the Misbourne Valley, BGS Beaconsfield Sheet 255, showing older chalk formations in the north west, also chalk overlain by pre-glacial Beaconsfield Gravels along the line of the proto Thames.



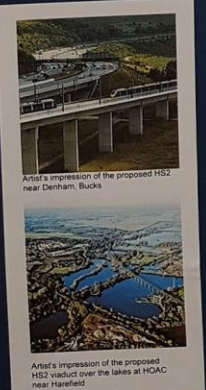
Bus disappearing into a collapsed chalk mine, Eariharn Road, Nonwich, 4th March, 1988. Chalk collapses are not uncommon, with local examples existing in Hatfield, Hertfordshire and Reading, Berkshire.

## The geological setting of the Chilterns

The Misbourne river valley is underlain by a thin veneer of peniglacial river sands and gravels overlying, at shallow depth, the White Chalk Subgroup which has a very weathered upper section, often recorded to a depth of c.16 metres in local borehole logs.

The Chalk of the Beaconsfield area (as recorded on the BGS geological map Sheet 255) is divided into three lithostratigraphic units (See Figure 1); these are the New Pit Formation, the Lewes Nodular Chalk Formation and the Seaford and Newhaven Chalks. This latter unit has not been subdivided into its two constituent formations as they cannot be separated in this area, but to all intents and purposes for the area of interest, we are considering the Seaford Formation.

Despite all being "chalks", the New Pit, Lewes and Seaford Formations have very different lithological characteristics which will impact on engineering quality and water flow, the latter both above and below the surface.



Artist's impression of the proposed HS2 viaduct over the lakes at HOAC near Denham, Bucks.

Artist's impression of the proposed HS2 viaduct over the lakes at HOAC near Harefield.



Figure 2: Schematic geological cross section through the Chilterns. Different chalk formations dip gently to the south, forming the northern rim of the London Basin. The red line shows how any proposed rail route would tunnel/cut from younger to older chalk passing from the southeast to the northwest.

# How do rocks affect our lives?



**How many rocks do you have in your home?**







# Fluorescent Rocks

## What makes them glow in the dark?



How do you know  
what a dinosaur  
had for dinner?

Take a look  
at our fossil  
poo!





**How big is that!**

**You'll be amazed at  
our fossil displays!**



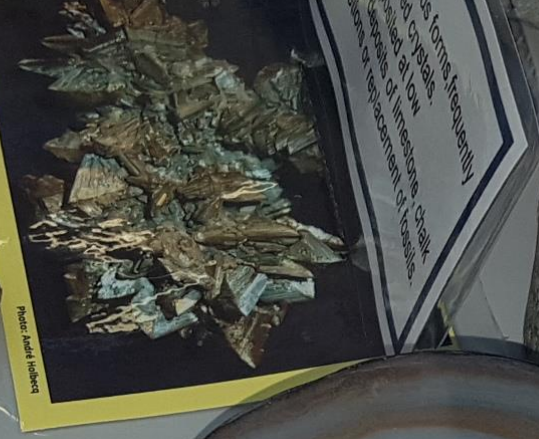




Look  
and  
learn







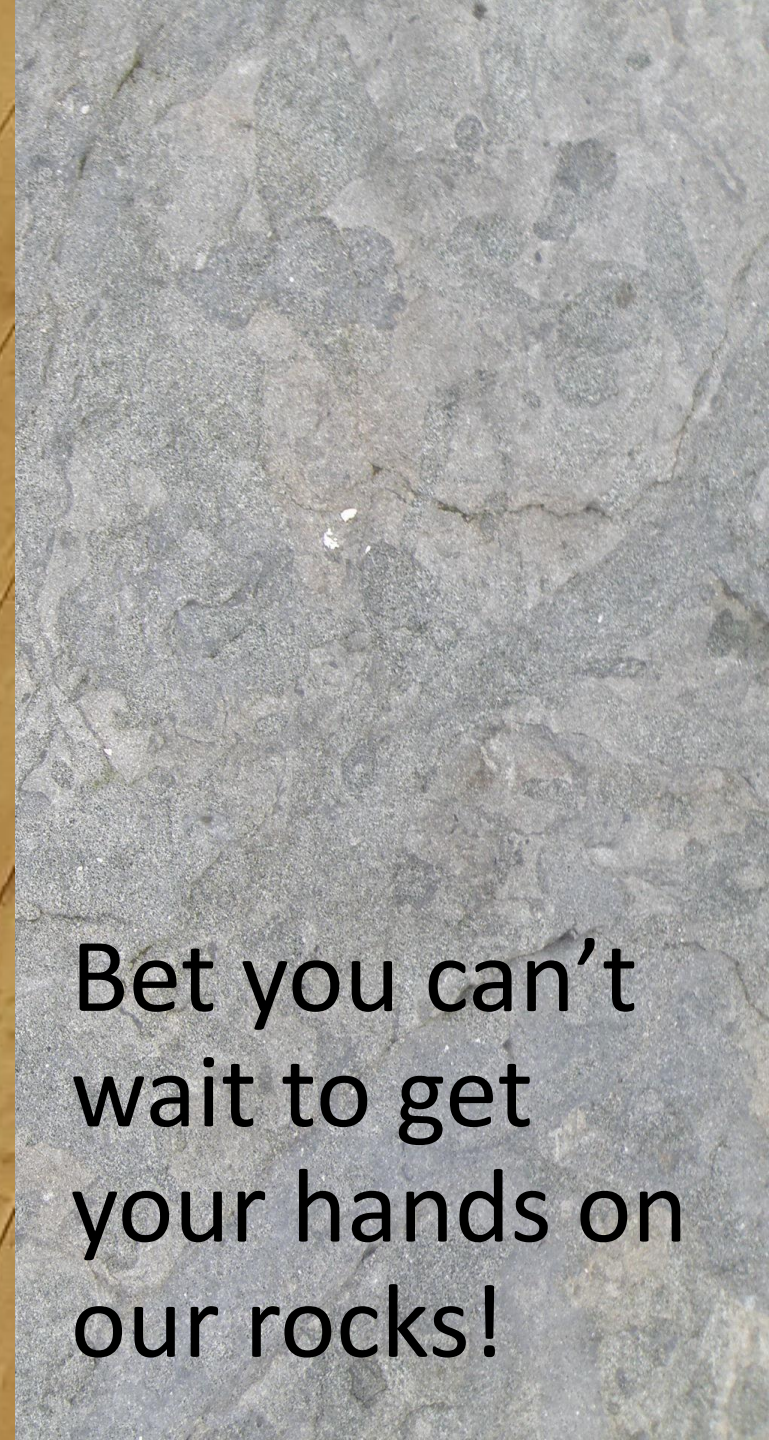
**Agate**  $\text{SiO}_2$   
 Banded chalcedony (crystalline quartz) which may have zones of different colours. Often artificially coloured for jewellery and ornaments.  
 ORIGIN: Occurs typically as a cavity infilling in lava.  
 FOUND: Widely distributed in volcanic areas.



Banded Agate Pebbles  $\text{SiO}_2$   
 Marazion Bay, Cornwall







Bet you can't wait to get your hands on our rocks!