

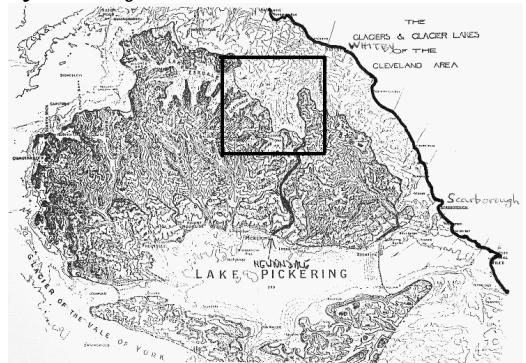
N.E.G.S. July 13th 2008

.....*“like furrows on the aged cheek where tears have ceased to flow”*.....
(T. Belcher. 19th. C. on his travels around the North York Moors, referring to the glacial drainage channels.)

The Cleveland Tertiary Dyke and The Effects of the Last Glaciation on the North York Moors. “Fire and ice.”

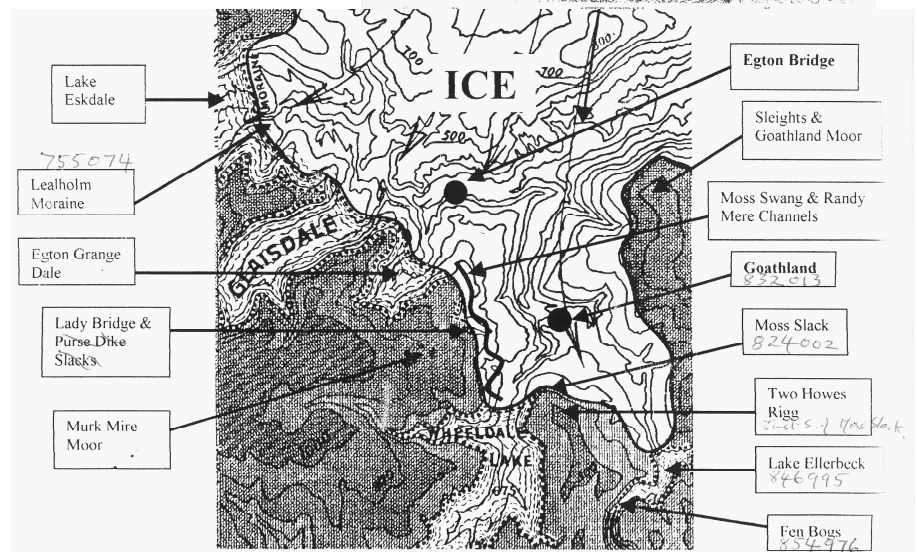
The Devensian cold period of the Pleistocene (2Ma.- 10Ka.) epoch began about 115,000 yrs. BP and ended about 10,000 BP. Glaciation took place during the late Devensian, beginning ~26,000 BP, reached a maximum at ~18,000 BP. & ended ~10,000 BP.

In 1902 Kendall published his monumental paper *“A System of Glacier Lakes in the Cleveland Hills.”* In it he explained how the existence of lakes and glacial melt water channels were the result of the Moors being almost surrounded by ice. Moorland over about 800ft. was not invaded by ice sheets or glaciers. Furthermore, the moors were not of sufficient height to generate ice sheets or glaciers. Consequently, meltwater which accumulated in some of the dales, e.g. Eskdale and its tributary dales found escape routes via channels, many of which can be identified because they



are anomalous to the present day drainage systems and/or no longer carry streams within them.

Surrounding ice plus melt water from it as well as runoff from higher ground led to the formation of **Eskdale & Vale of Pickering** lakes. Their formation and interrelationship was the problem Kendall attempted to solve. He started his work at Newtondale & carried his research going back step by step to complete the picture of lakes & glacial drainage channels.



He postulated that the lakes would overflow producing drainage channels either away from the ice margin, which he called **direct overflow channels**, or parallel to the ice margin which he called **marginal overflow channels**.

It must be pointed out, however, that the existence of “overflow channels” has been re-examined, (e.g. Gregory 1962). He argued that many of the channels could have been subglacial, i.e. flowing beneath stagnant ice.

This field excursion will focus on glacial drainage channels in the Goathland area and their relationship to the huge gorge of **Newtondale**.

The map shows how the ice front blocked the eastern end of Eskdale, leaving a terminal

HORIZONTAL LINES =
CENTRES OF IGNEOUS
ACTIVITY.

OTHER LINES: SELECTED
DYKES

Skye

Rhod

ARDNACHAN

MULL

ARRAN

CAIRNRHYN

CLEVELAND-
ARMATHWAITE
DYKE

channel now known as Lady Bridge Slack and continued towards the valley of **West Beck**,

to **Howes Rigg** via the **Moss Slack**
from ice to the north created a small **Lake**
the huge direct overflow channel of
the Vale Gorge emptied into the Vale of
emptying into Lake Humber via Kirkham

nt of Lady Bridge, Purse Dyke & Hollins
a lower level the almost parallel channel of

A detailed micrograph of a rock sample, likely a thin section. The image shows a complex texture with various mineral grains. A prominent dark, elongated feature is labeled 'Cleveland Dyke'. The surrounding material is a mixture of light and dark minerals, with some areas showing a more crystalline structure.

ce. The Cleveland Dyke is visible in places
cotland, Cumbria at Armathwaite where it
on to the North York Moors. Sites where it
at Ayton, Castleton and Egton Bridge.

the dyke, being a more resistant rock, can be direction, from which Langbaugh (Long

hill), an area of Cleveland, gets its name. The ridge can be seen most clearly at the top of Cliff Rigg quarry near Great Ayton.

The tough rock of the dyke has been extensively quarried for road stone, as can be seen in several places where it outcrops. A spectacular line of quarrying, known as the Whinstone Ridge, is visible on the moors about 2km. N.E. of Goathland.

Its metamorphic effect on adjacent country rock is small; slight induration and spotting of shale. The dyke is dark grey to black, fine grained. Small glassy crystals (phenocrysts) of feldspar can be seen scattered about. It is classed as a basaltic andesite, its main minerals being plagioclase feldspar, pyroxenes (augite & pigeonite), and opaques (iron oxides) set in a glassy (sometimes devitrified) matrix. According to some authors, the dyke (volume *c.* 85 km³ was initiated in a large magma chamber below Mull subject to a small excess magmatic pressure. Lateral migration at relatively high velocity (1–5 ms⁻¹) caused emplacement of the dyke in 1–5 days. Following emplacement, minor vertical ascent of magma may have contributed to the local en echelon distribution of dyke segments. More information about the dyke can be found on the TVRIGS website: www.tvrigs.org

ITINERARY

1. Meet Egton Bridge car park at NZ8044 0537
2. Duckscarr Quarry - Cleveland Dyke. NZ7979 0528
3. Lady Bridge Slack intake NZ7999 0293
4. Carry on south on Murk Mire Moor to turning point, NZ7965 0122
5. Castle Hill. Moss Swang intake. Double channel at Castle Hill. Park at NZ8088 0348
6. Pass Randy Mere reservoir. Possible stop at approx. 814016
7. Moss Slack NZ8241 0016 on Two Howes Rigg: Park at NZ8262 0067 near Goathland Parish Church.
8. Possible look at Channel behind Goathland Parish Church. NZ82800 0064
9. Entrance to Newtondale Channel at Fen Bogs. Park at SE8554 9863, near junction with A169.)
10. Goathland Moor to see trend of Cleveland Dyke. Travel north up A169 Sleights/Whitby road, turn left onto Goathland road, park at next road junction at NZ8520 0286

REFS:

A System of Glacier-Lakes in the Cleveland Hills. 1902. P.F. Kendall. Q.J.G.S. Vol. 58 pp. 471-571
Newtondale, the Forge Valley and the other Gorges in the North Yorkshire Moors. 1989. S. White. Pub. by the author. ISBN 0 9512215 1 5
Yorkshire Rocks and Landscape. 2006 Excursion 11 J. Senior & J. Rose. Pub. Y.G.S.

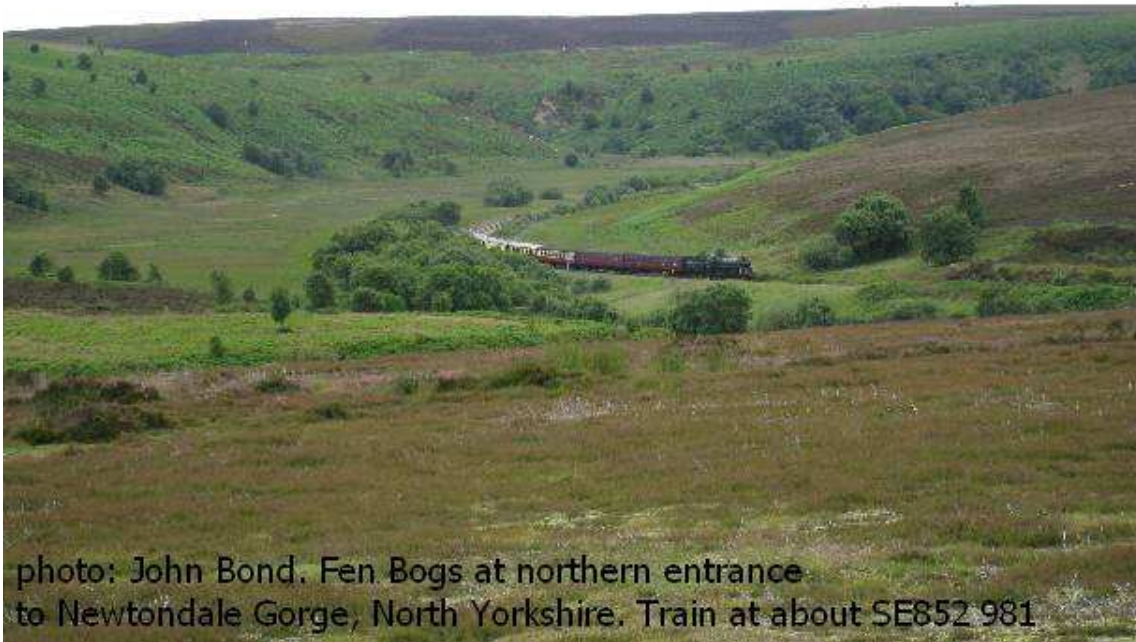


photo: John Bond. Fen Bogs at northern entrance
to Newtondale Gorge, North Yorkshire. Train at about SE852 981

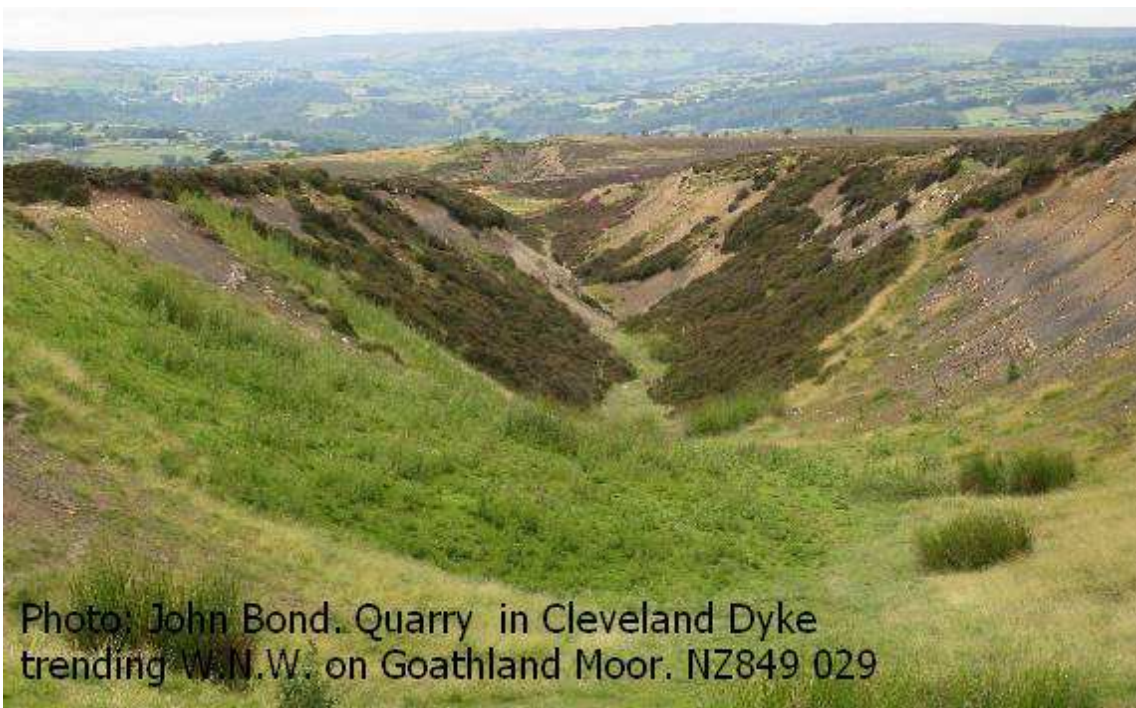


Photo: John Bond. Quarry in Cleveland Dyke
trending W.N.W. on Goathland Moor. NZ849 029