

# The Ecton Copper Mines









**Ecton**

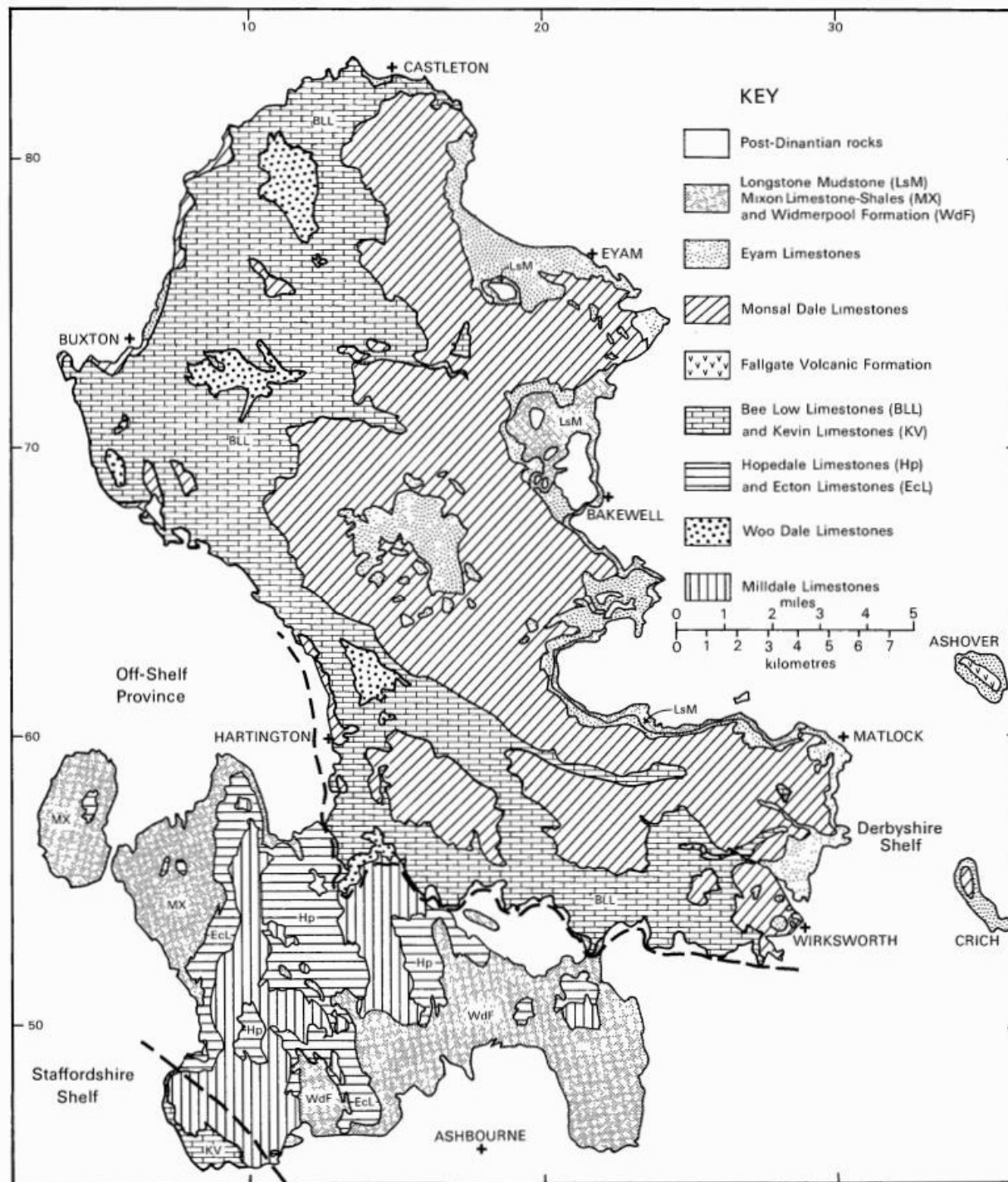




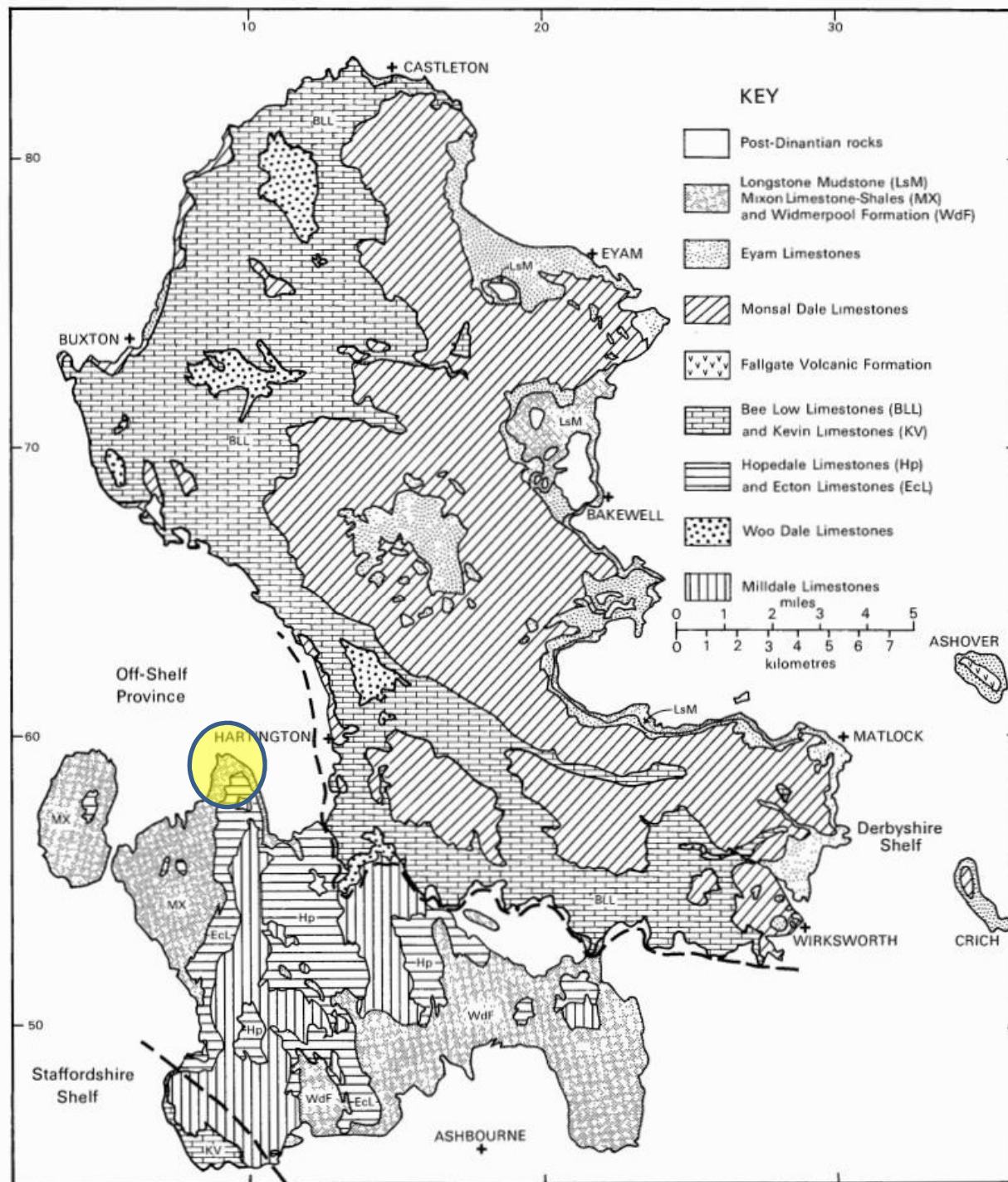














# Ecton geology

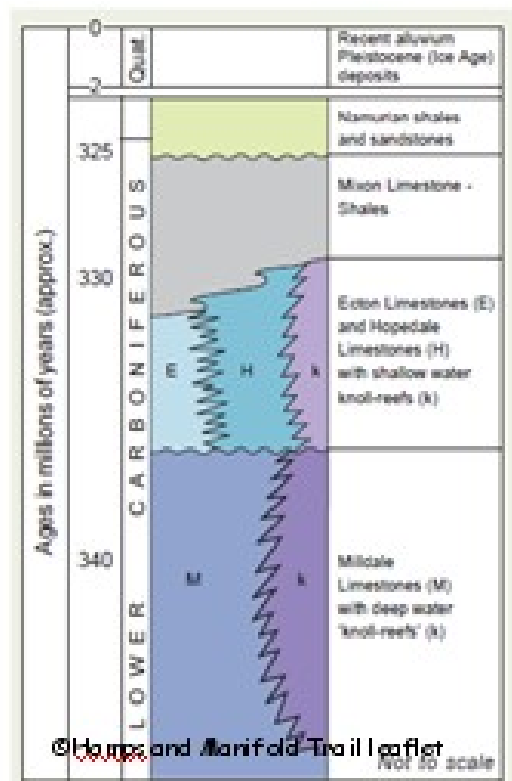
## Carboniferous Limestone

### 360-330Ma

Shelf

Basin

Visean Stage



Longstone Mudstones	
Eyam Limestone	
Monsal Dale Limestone	Mixon Limestone - Shales
Bee Low Limestone	Hopedale and Ecton Limestones
Woo Dale Limestone	Milldale Limestones

Brigantian

Asbian

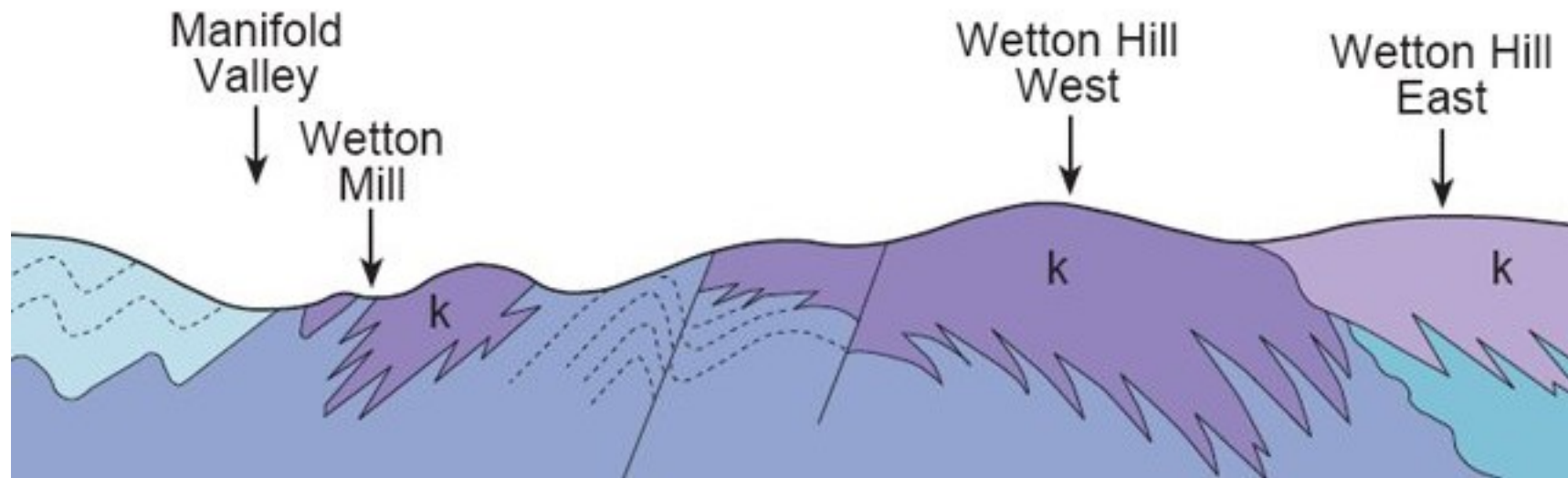
Holkerian  
Arundian

Chadian

Courceyan / Tournaisian



# ECTON ANTICLINE





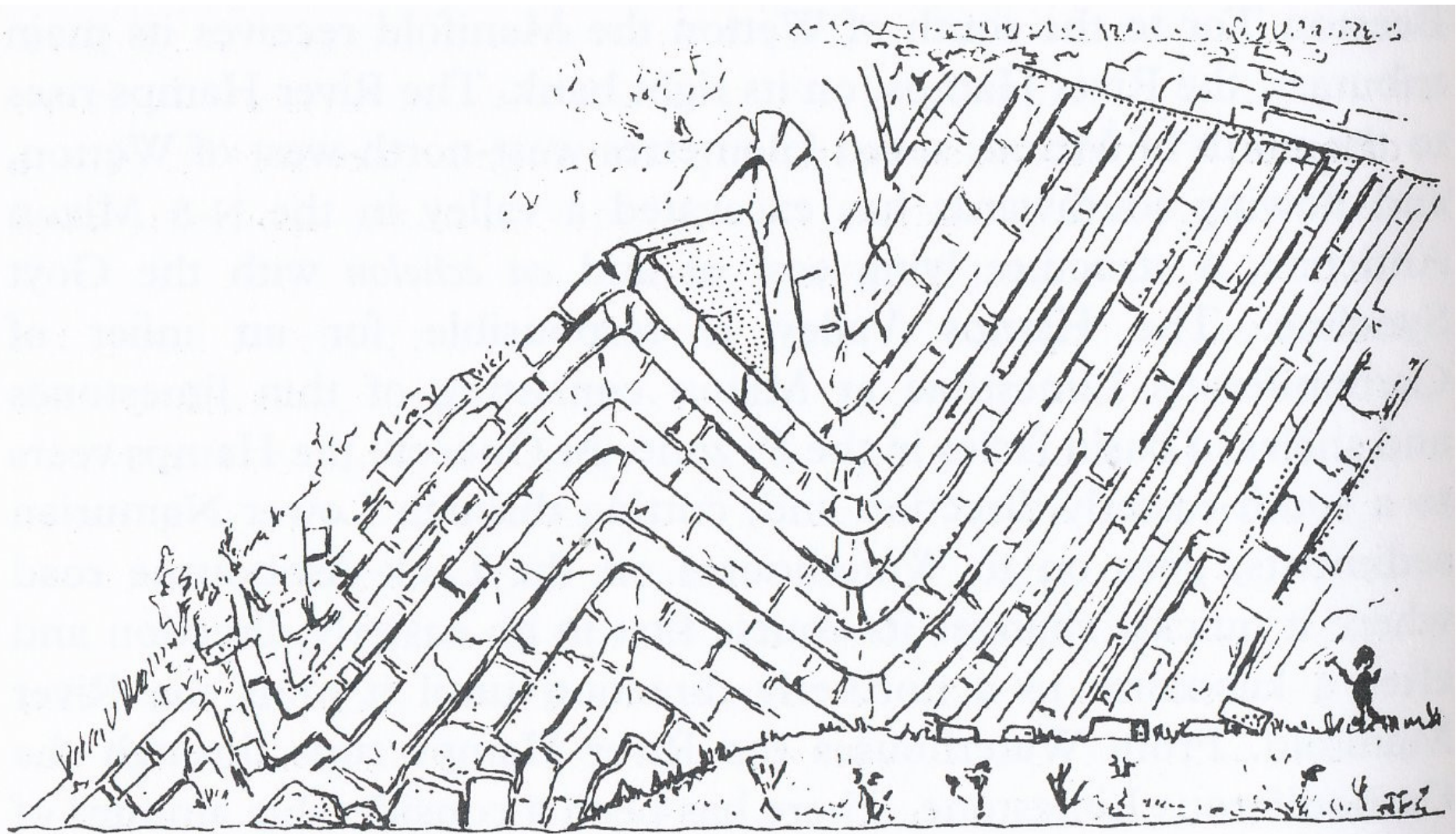


Fig 73 Sharply folded limestones with shaly partings at Apes Tor, Manifold Valley near Warslow, Staffordshire. A thrust is visible at the top of the quarry on the right



# Apes Tor folding





# Clayton mine section

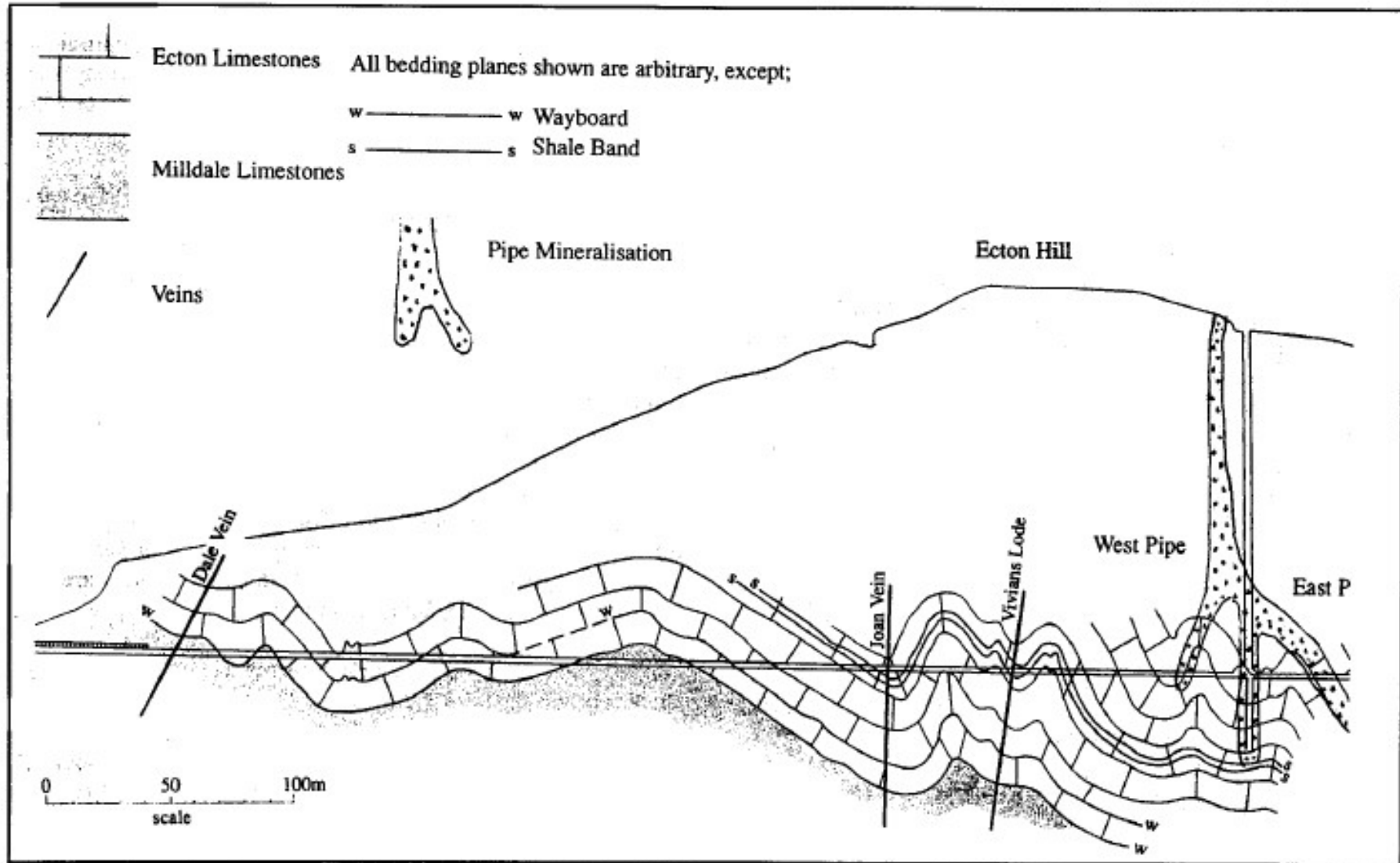


Fig. 5. Section along Clayton Adit (redrawn from Critchley 1979).

From Trevor Ford 2000



# Folding in Clayton mine





# Faulting in Clayton mine



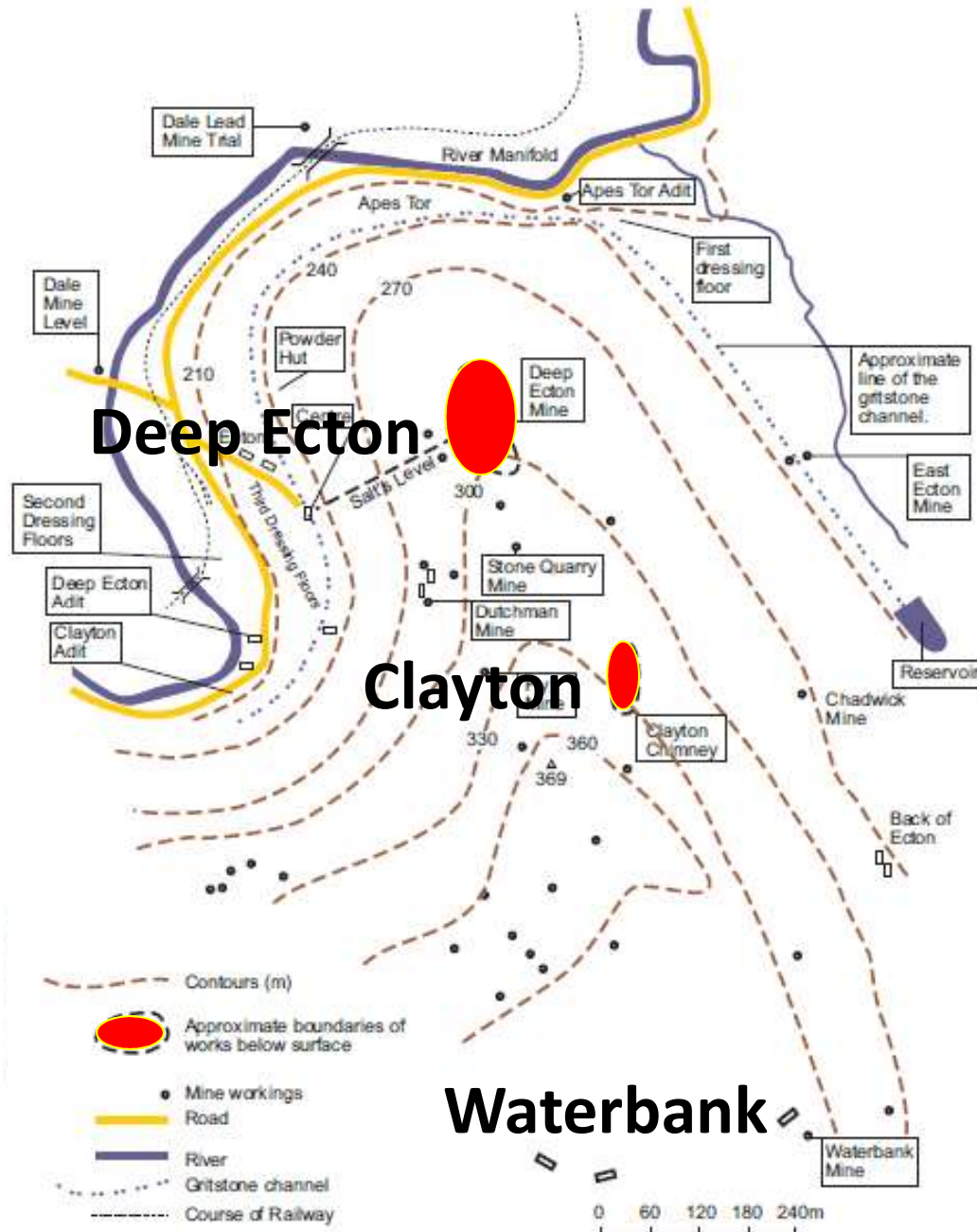


# Deep Ecton adit syncline





Map of Ecton Hill and the Mines



# Ecton Hill and mines

There are about 40 shafts and open pit workings around Ecton Hill.

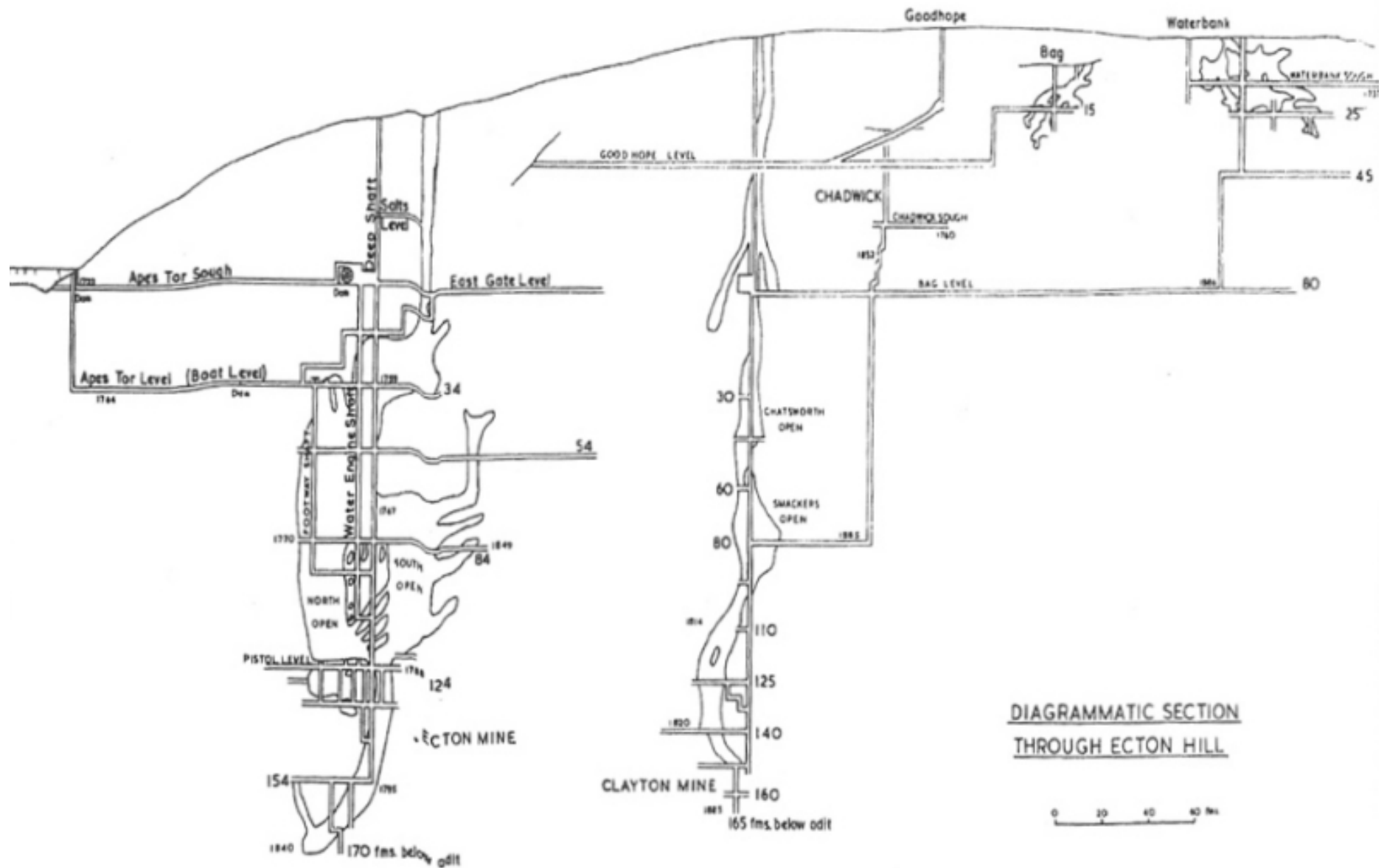
The three main mines were Deep Ecton, Clayton and Waterbank.

From EHFA website



NORTH

SOUTH



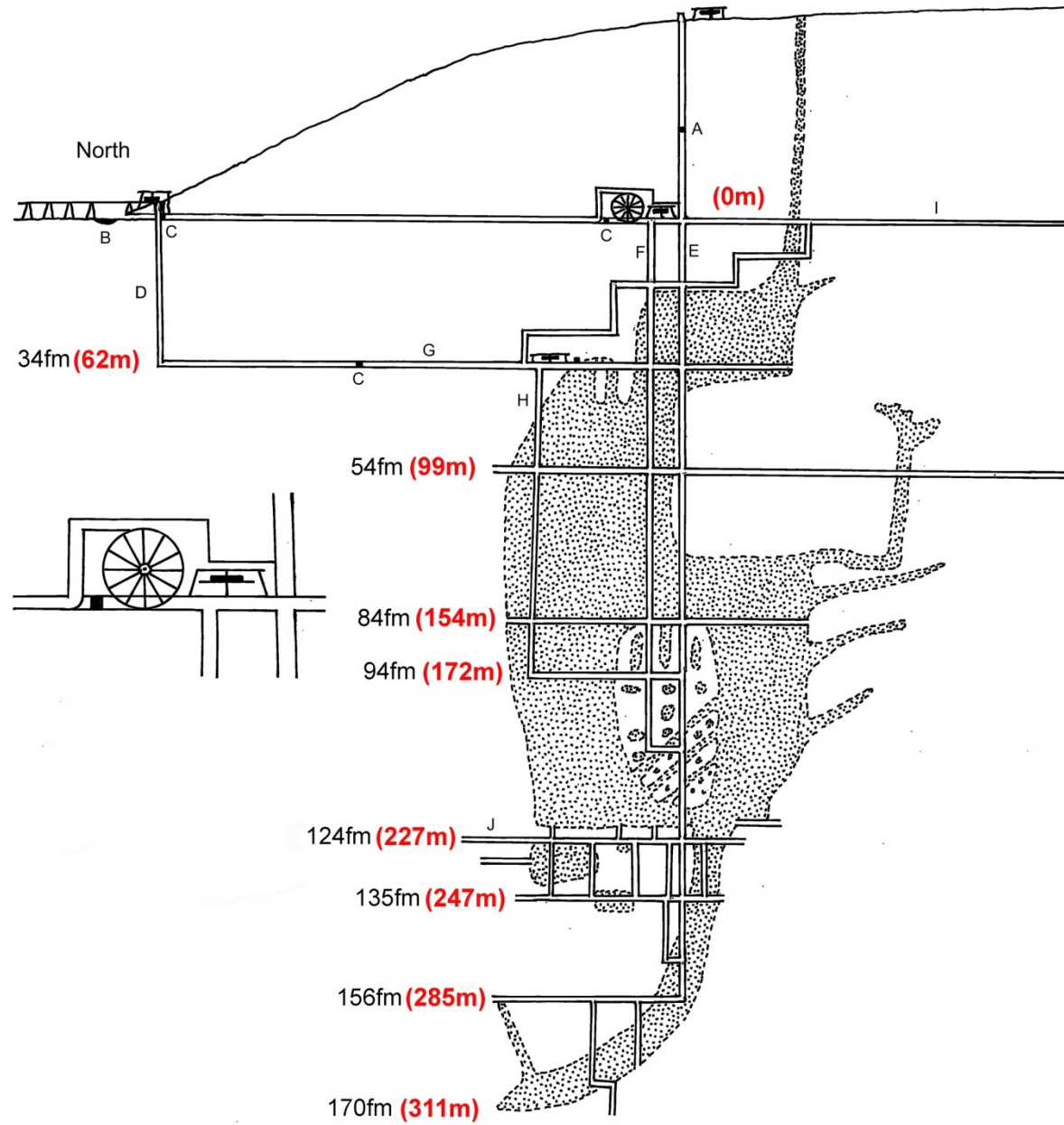
DIAGRAMMATIC SECTION THROUGH ECTON HILL





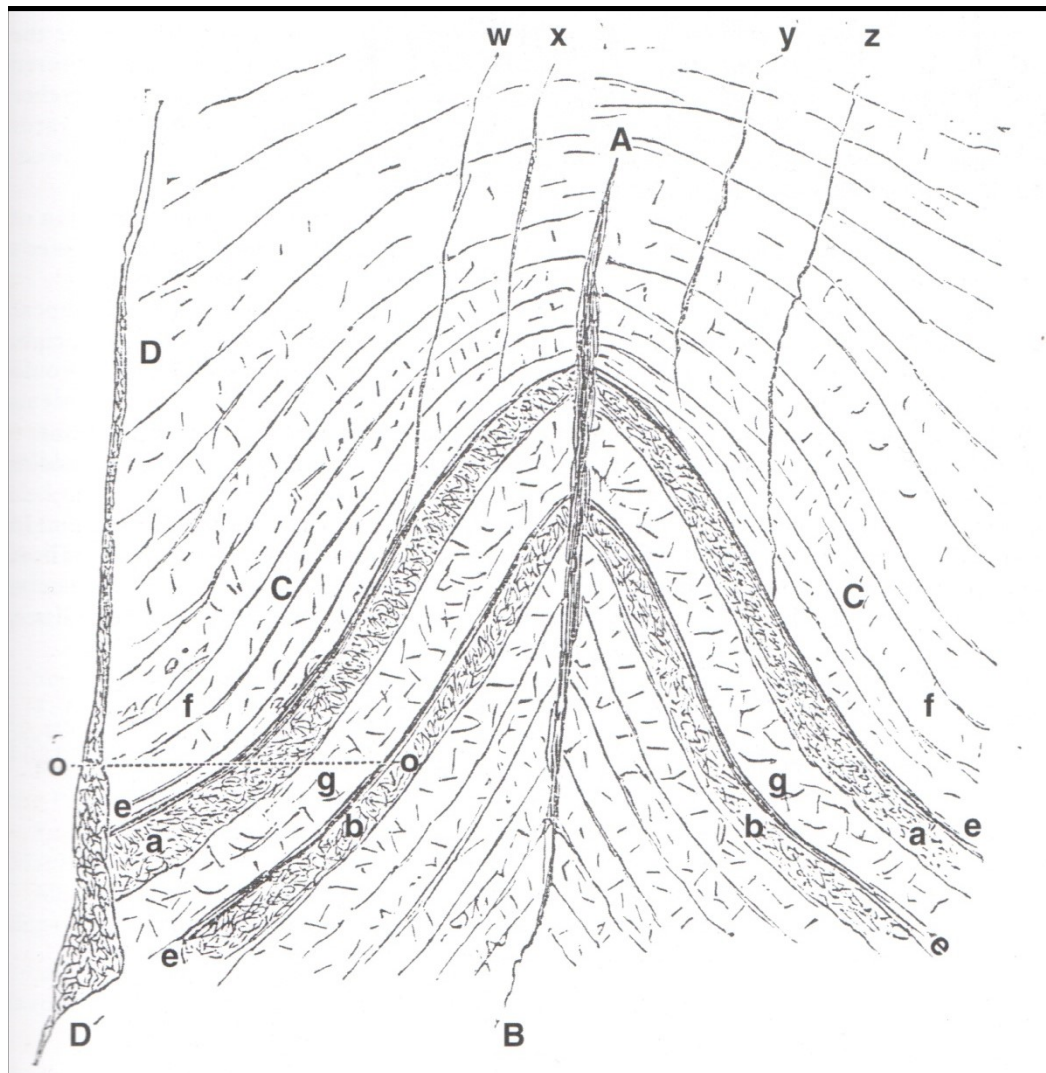
# Meads 1858

South





# Ecton mineralisation



**From Porter 2004**

A 'huckle saddle' with beds of ore  
a – a and b – b.

The ore occurs in semi-vertical  
pipes, rather than veins

Mineralisation is thought to be  
caused by warm (100°C) saline  
(25%) mineralised brines from shale  
basins to the west rising into the  
Carboniferous Limestone. The  
brines dissolve the limestone and  
later precipitate copper sulphide  
(chalcopyrite –  $\text{CuFeS}_2$ ) and calcite  
–  $\text{CaCO}_3$



# Ecton mineralisation



Ecton ore Chatsworth collection From Mineralogical Record 2005 – photo by Mick Cooper



# Ecton Mine history

1665 Gunpowder was used at Ecton, the first time in Britain for underground mining

1784 A Water pump was installed to allow mining to great depths below the river level

1788 First steam team engine (Boulton and Watt) was used to wind ore up from what had then become the deepest mine in the the country

1814 An underground steam engine was installed to pump out water, its ventilation was by means of the old pipe workings

1840s The mine reached a depth of 428m from the surface, 323m below the River Manifold's water table

1855 When the water pump was removed, and the deep workings allowed to flood, it took several years for them to refill

1880s High Explosive and compressed air drilling rig were used at Ecton

1889 Mining ceased at Ecton



## **Ecton – The Dukes of Devonshire 1760 – 1818**

Extensive development of ore body

Discovered rich ore body – 15% Cu (maybe!)

Substantial profits – 1786 - £40,000 pa ~£6m pa today

Total profit - **£302,000** in late 18<sup>th</sup> C.

Worked for own account

Paid for Chatsworth House and The Crescent at Buxton  
and Georgiana's gambling debts

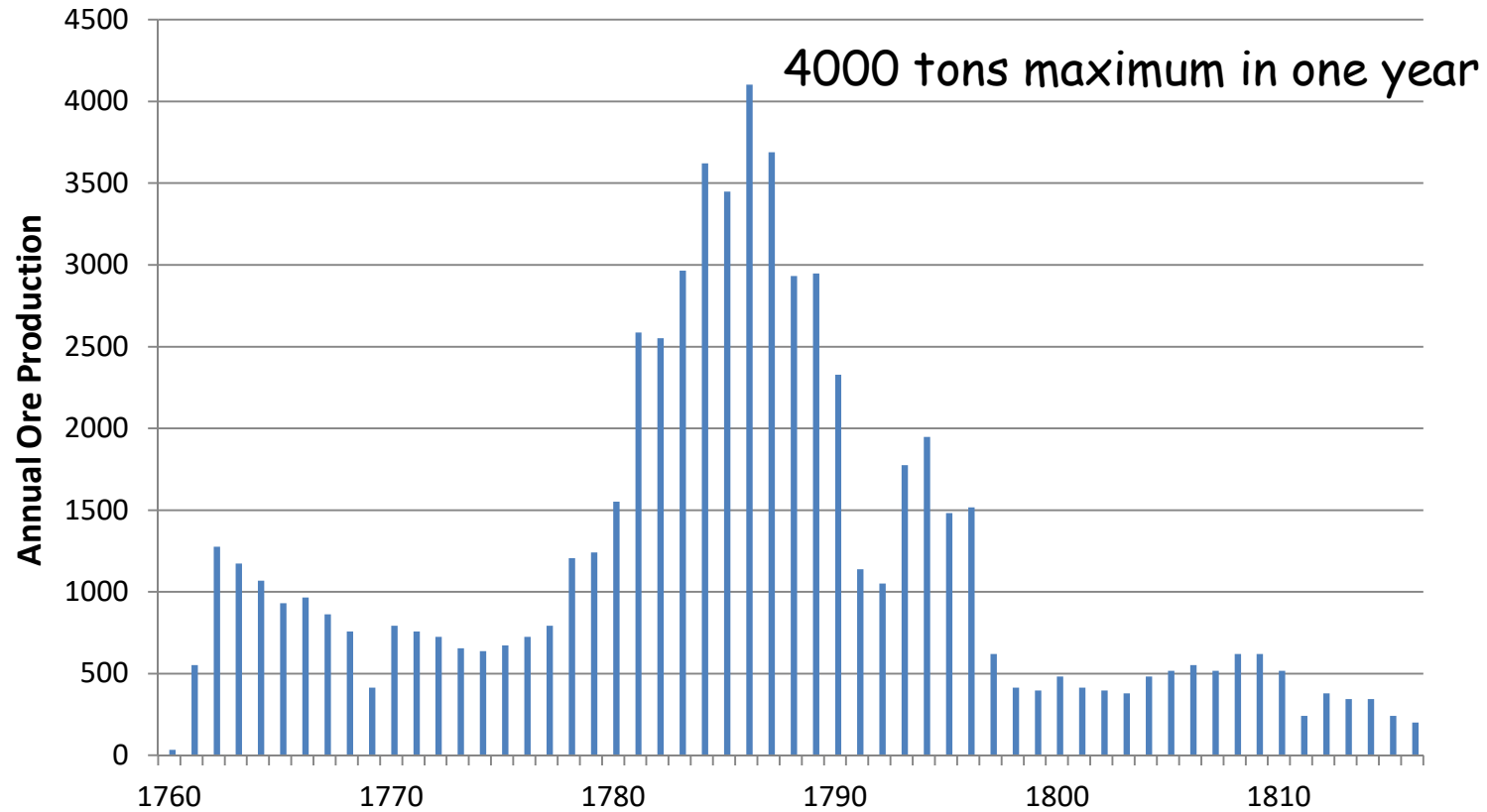
Innovation: Boulton & Watt engine in 1788

Copper used in brass and to sheath wooden hulls

Copper ore sent to nearby Whiston for smelting



# Ecton Hill – The Dukes Copper production

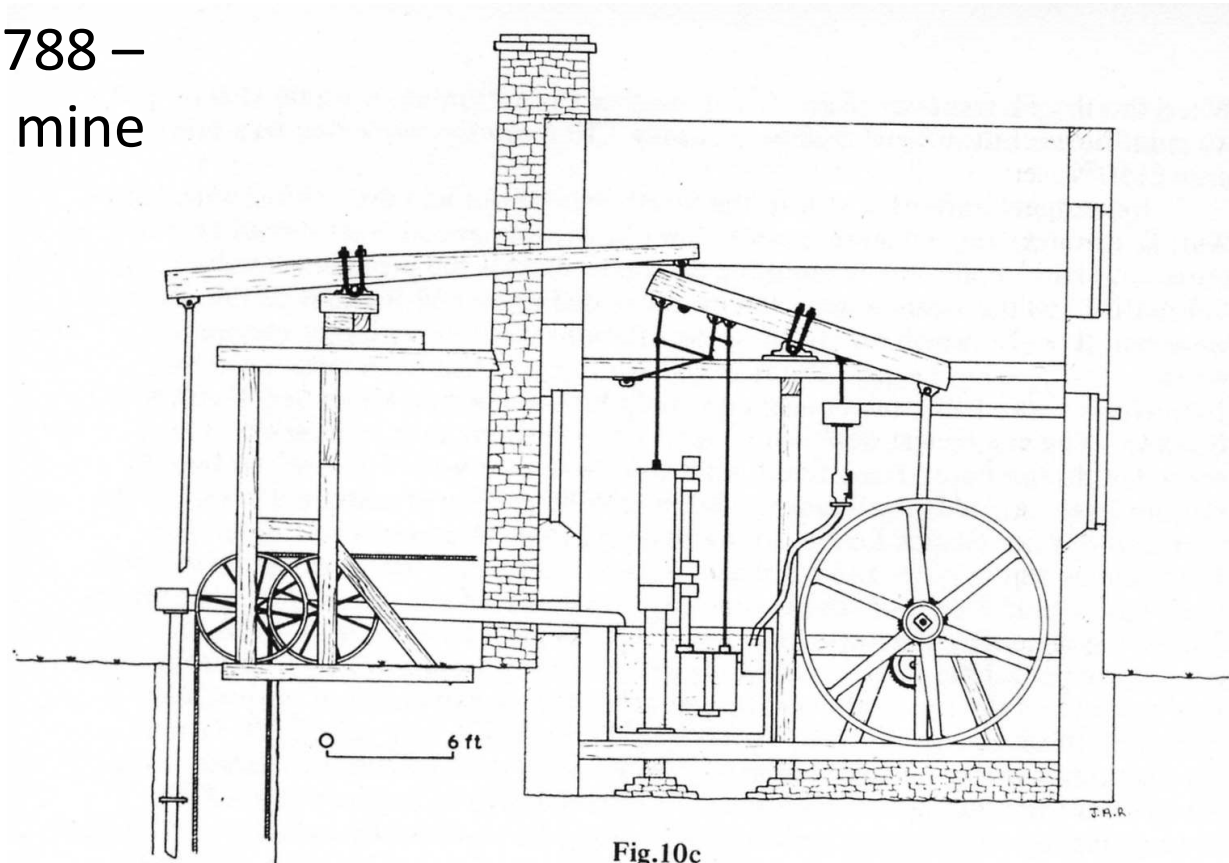


Total of around 100000 tons



# Ecton – Boulton & Watt winding engine

Installed 1788 –  
just as the mine  
failed!





# Ecton Hill – After The Dukes 1818 >

## Decline and losses

Date	Company	Copper	Lead	Zinc	Gross Income	Profit
		tons	tons	tons	£	£
1826-38	Ecton Copper Co	1,608	114	-	12,050	
1839-46	Ecton Mine co	1,283	73	1,186	10,178	
1846-51	Various	156	27	-	1,253	
1838-50	Burgoyne Mining Co	152	8	20	3,824	-7,257
1851-55	Duke of Devonshire	241	32	-	2,551	
1851-57	Ecton Mountain Co	107	87	-	1,984	-3,134
1858-61	Ecton Consolidated	23	19	-	375	+1,638
1862-66	New Ecton Mining	31	20	4.5	481	-4,669
1866-68	Waterbank & Ecton	22	35	-	444	-1,834
1868-74	Ecton, Clayton & W	15	128	-	1,423	-9,704
1883-89	Ecton Company Ltd	150	25	270	1,667	-44,250

# SALTS LEVEL





# DEEP ECTON ADIT











**FLOODED PIPE WORKING**

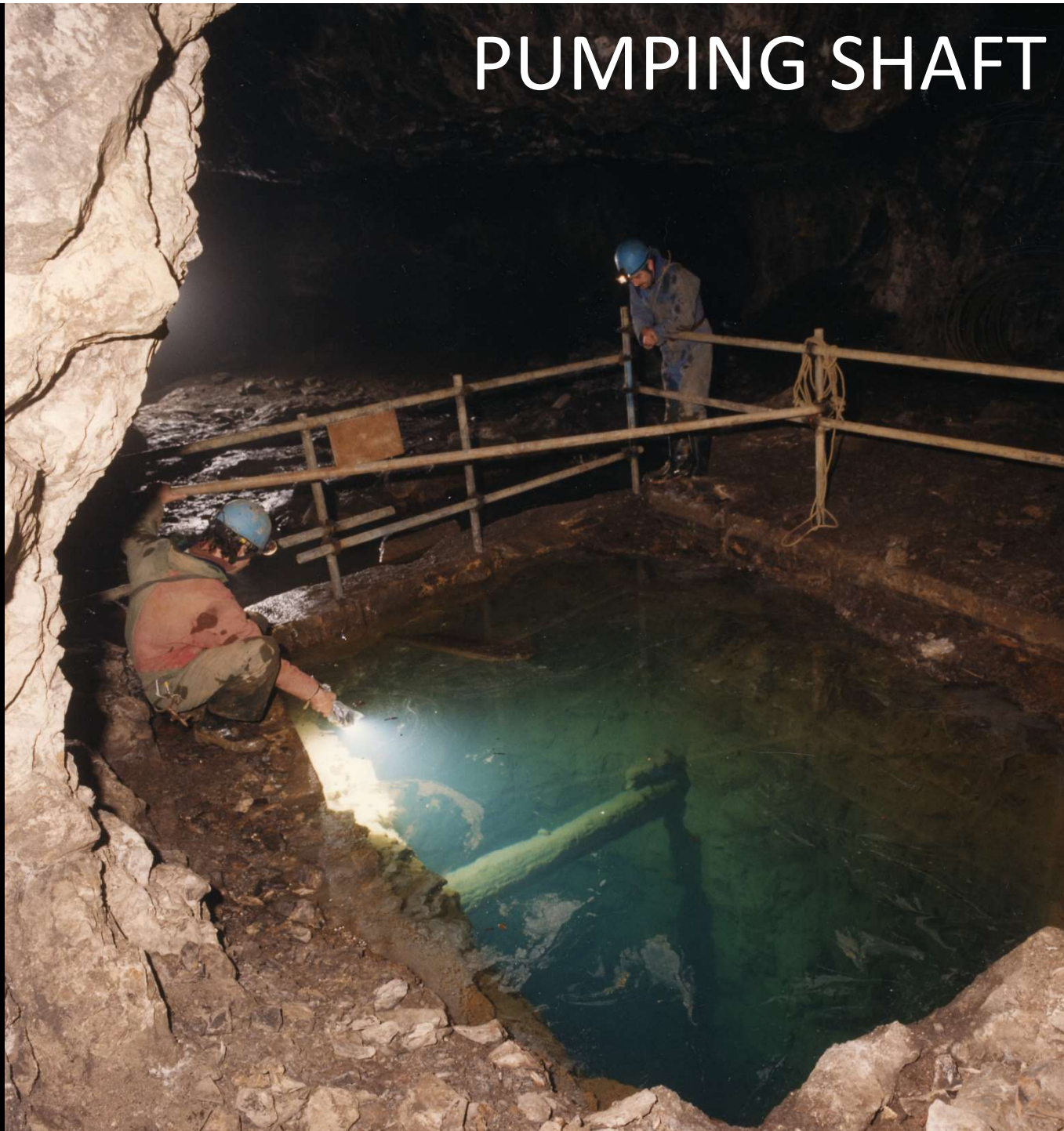


# ECTON MINE: PUMP CHAMBER





# PUMPING SHAFT









# Ecton Today

- 
- Bought by Geoff Cox in 1950s
  - Used for educational courses until 2000
  - Placed in Trust in 2005 - EMET
  - New educational courses – EHFSA
  - Research facility – GPR, laser mapping, EU projects UNEXMIN, UNEXUP

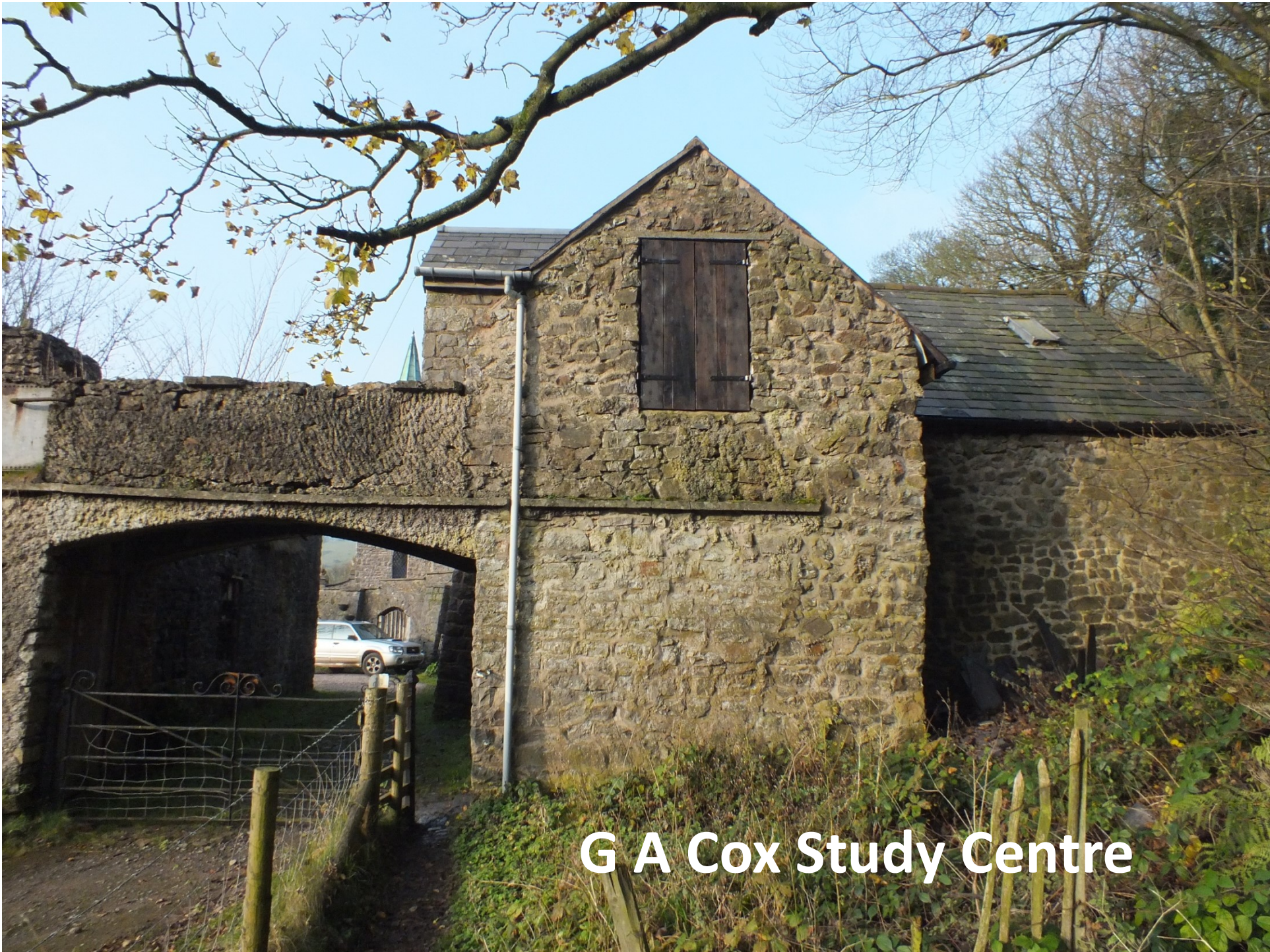












**G A Cox Study Centre**



# EMET's Aims

- To promote education and research in applied geology, mining and mineral extraction
- Preserve for the benefit of the public Ecton mine and all its shafts and adits



# Housekeeping

- Maintaining shafts, fences and ladder-ways
- Maintaining the GA Cox Study centre





**Keeping shafts safe  
Waterbank Mine**





# School group – open air classroom









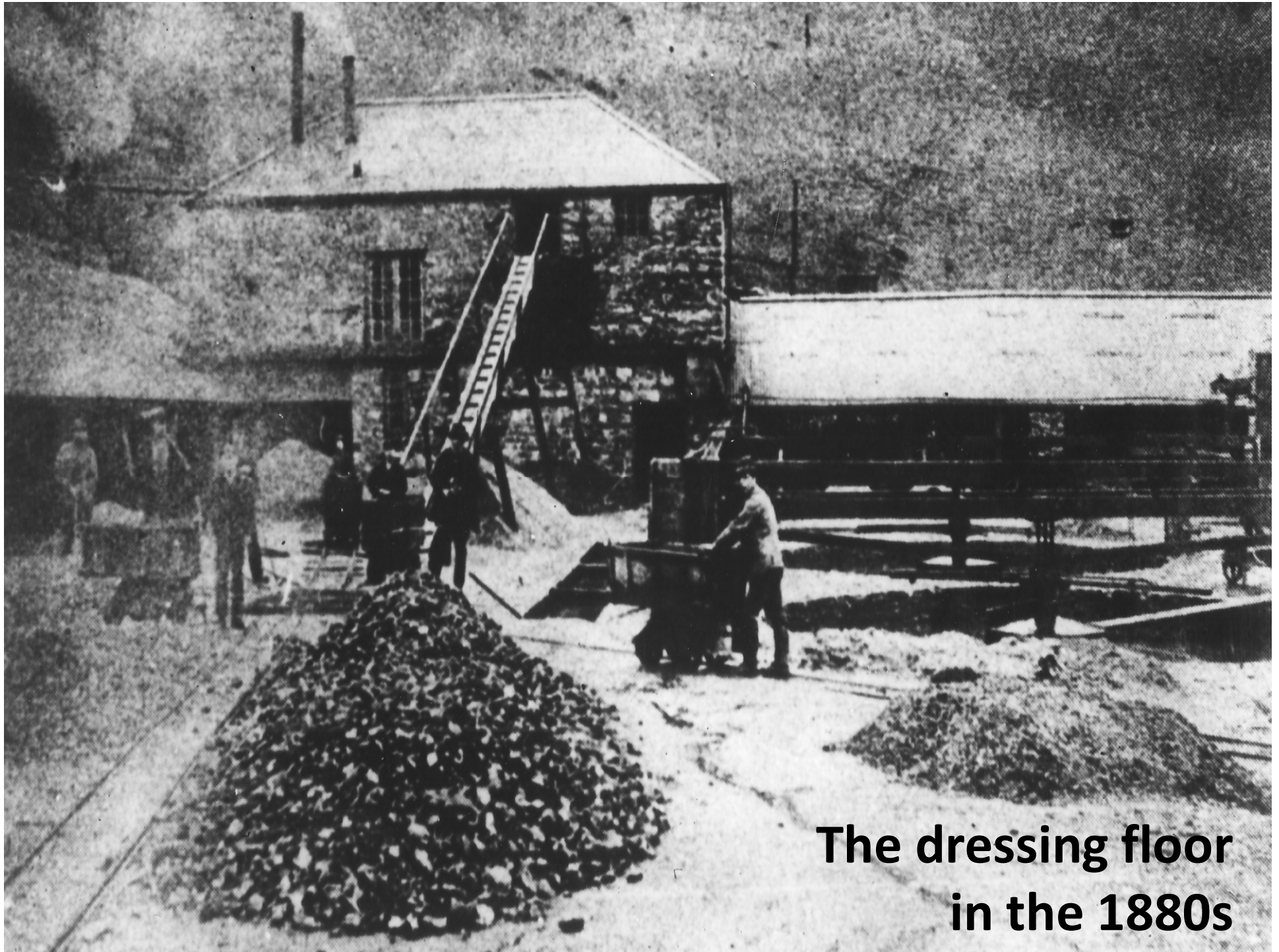






**Ecton Mine - engine house restoration, 2014  
Francis Pryor (archaeologist) with Paul Mortimer (NT)**





**The dressing floor  
in the 1880s**





**...and in 2015**









**Restoration of dressing-floor wall, 2016  
Funded by Historic England**





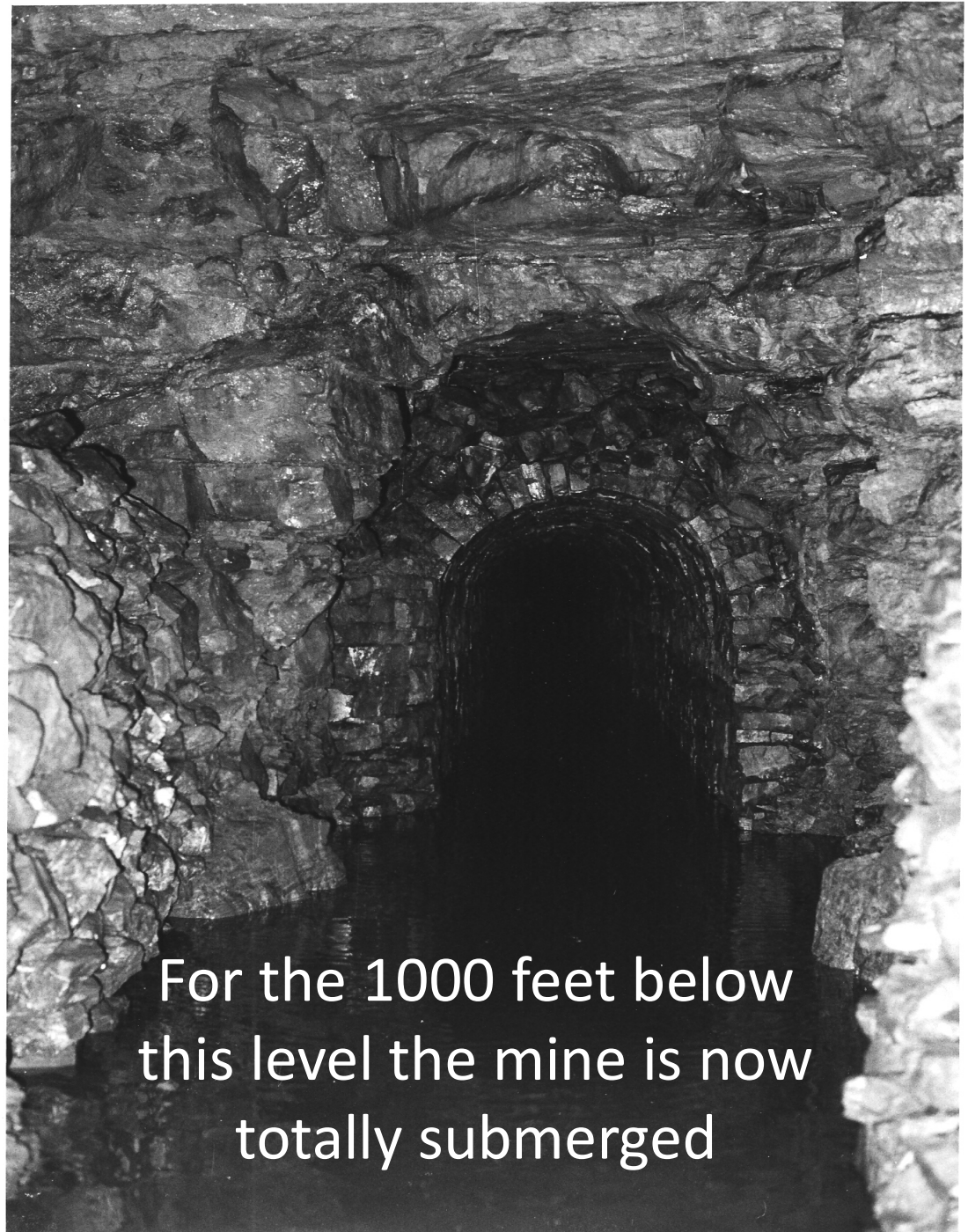


# Regulation and Partnership

- Hillside: SSSI (botany) – *Natural England*
- Mine: SSSI (geology) – *Natural England*
- Mine: listed monument – *Historic England*
- Mine – *HSE Mines Inspectorate*
- Adit water outflow – *Environment Agency*
- Private water supply – *Staffordshire Moorlands*
- Planning consents – *Peak District National Park*
- Engine house – *National Trust*



“Deep Ecton”  
adit  
at the level of  
the  
River Manifold



For the 1000 feet below  
this level the mine is now  
totally submerged



