A Random History of Mining
(And thus the industrial revolution)

Matthew Dockrey       A Day That Will Live In Infamy, 2009
The Neolithic

Flint, Obsidian, Chert, some others.

Why these?
Conchoidal Fractures

Image courtesy of sterlingsculptures.com
Conchoidal Fractures II

Image courtesy of sterlingsculptures.com
Conchooidal Fractures III

Image courtesy of sterlingsculptures.com
Flintknapping

Image from texasbeyondhistory.net
Grime Graves

Image discoursesy of English Heritage
Holy hell, can you freaking imagine?

The great void

The next couple thousand years, kind of mysterious

Not much left, and there wasn't much written about it

Until...
Premier manual of mining and metallurgy for hundreds of years (1556)
Georg Bauer => Georgius Agricola
Joachimsthal and Chemnitz
(Joachimsthal => Thaler)
First English translation in 1912 by Herbert and Lou Henry Hoover
Oddly superstitious
such an angle as represents the slope of the mountain, so that its lower end may reach the end of the straight cord; then he stretches a third cord.
divide it obliquely; however, my discourse is now concerned mainly with *vena profunda*, but most of all with the metallic material which it contains.

ground. This kind of an opening, however, differs from a tunnel in that it is dark throughout its length, whereas a tunnel has a mouth open to daylight.
Water, water everywhere...

If you dig deep enough, most holes will eventually fill with water.

Can drain (with an adit) or pump.

Both work better in mountains...
Water wheels? Eh.

Another source of power was needed
People had been speculating about (and sometimes even building) steam engines since the aeolipile in ~250BC
But only as a toy or curiosity, never trying to solve a real problem
Until...
Thomas Savery

“A new invention for raiseing of water and occasioning motion to all sorts of mill work by the impellent force of fire, which will be of great use and advantage for drainning mines, serveing townes with water, and for the working of all sorts of mills where they have not the benefitt of water nor constant windes.” Patent (without description!) 1698

The Miner's Friend; or, An Engine to Raise Water by Fire (1702)
First to use the term “horsepower”

Slow, inefficient

Could only lift about 40 feet

Only ever really used in gardens

Tended to explode

But it (kind of) worked!
Thomas Newcomen

Ironmonger, preacher

Not fancy enough of a guy for us to have a picture or know much about him, sadly

Practical, good at tinkering

Utterly screwed by intellectual property laws AND Royal Society snobbery
The Newcomen Atmospheric Engine (1712)
Video: Industrial Revelations, Episode 1
Problems

Still not very efficient
  Horrible boiler design
  Hot-cold-hot-cold cylinder
Lack of precision
  Machining was limiting
James Watt

Added condenser, other refinements: 1765
Note: 50 years after Newcomen!
Better cylinder design possible due to improvements in machining
Another intellectual property bastard
Held back high pressure steam as long as possible
Not really deserving of an SI unit, if you ask me
So...

Can now drain deep mines
Can also hoist ore and spoil as well as water
But what about people?
The Man Engine

Already have pump rods going up and down, so why not ride them?

Started early, 17\textsuperscript{th} century?

Continued into the early 20\textsuperscript{th} century

Levant disaster, 1919, 31 people killed
Animation:
http://www.tinmining.co.uk/private.htm

Video:
http://www.prosieben.de/wissen/multimedia/videos/videoplayer/58030/
In Conclusion

It is hard to separate the development of mining technology from technology in general.

We've done some pretty crazy stuff to get at minerals, even before the monster devices of the last 100 years.

Miners like beer, right?

Let's go honor their lifestyle.
This image from Astronomy Picture of the Day, many others from Wikipedia, duh.