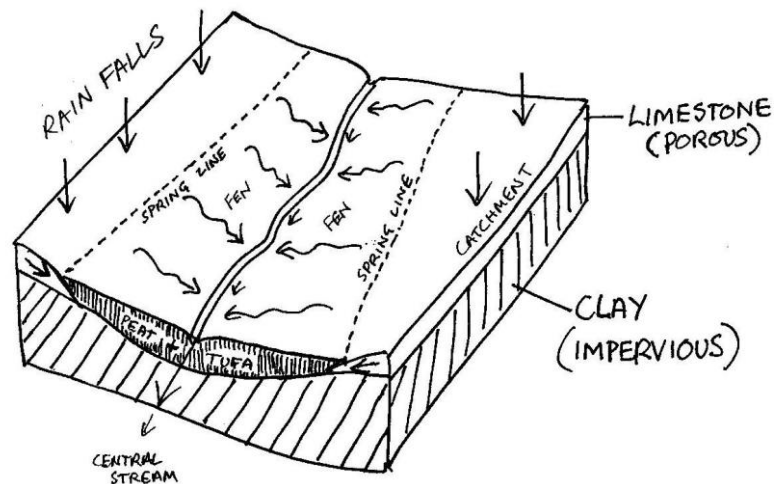


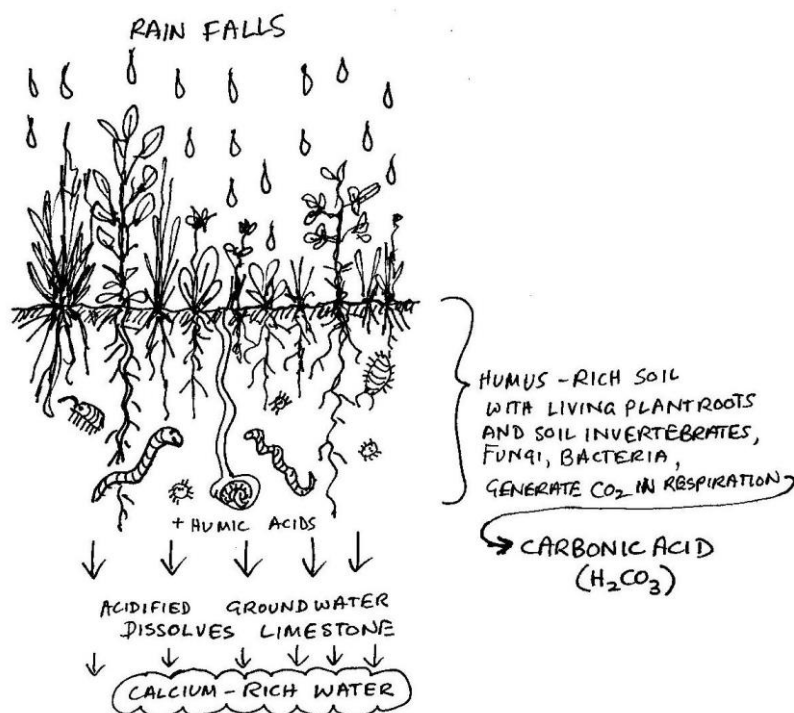
How does a Calcareous, Valley-head Spring-fen like the Lye Valley Work?

A **fen** is a type of peat-accumulating wetland fed by (depending on) mineral-rich groundwater or surface water

The **green areas** around the Lye Valley supply the **spring water** (groundwater) which is the life-blood of the Lye Valley spring-fen (green areas = the fen 'catchment' area). Such fens are **alkaline** wetlands and the spring water needs to be extremely high in dissolved **calcium**.

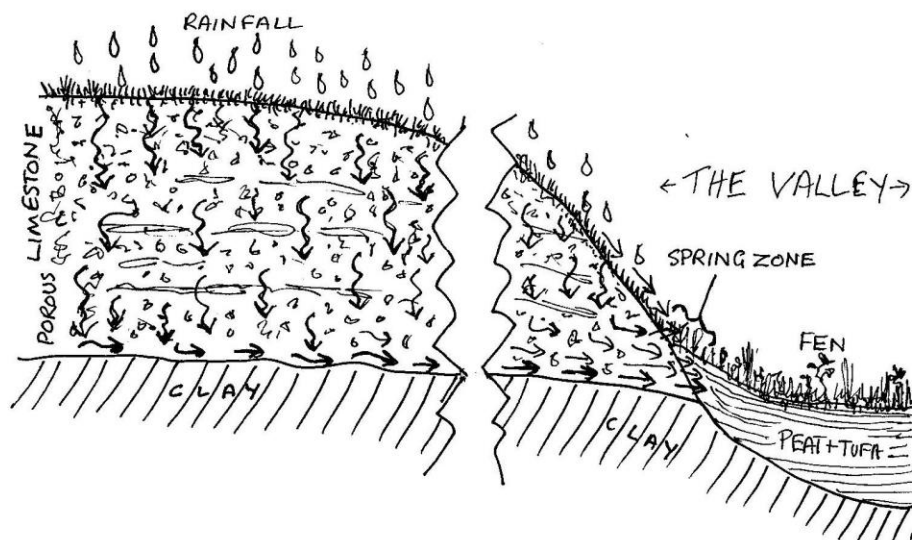


Rain enters the soil in the catchment, then percolates slowly into the ground and becomes **more acidic** from respiration (producing CO₂) of living plant roots and soil organisms; this happens only in soft vegetated green areas. This '**becoming more acidic**' by going through 'living' (active) soil is vital...



As the rain goes through the porous limestone rock below, the acidity helps calcium dissolve in the water (it becomes very **'hard' water**, the sort that makes limescale in your kettle) and it moves through the pore spaces in the limestone rock. When the now **calcium-rich water** reaches an impervious rock layer like clay, it cannot enter so seeps sideways, downslope towards the Valley.

Months **or years later** it emerges continually from the spring or seepage zones on the Valley slopes:



This continuous water emergence over thousands of years encourages wetland vegetation and the accumulation of dead plant remains to form **peat** - a black substance that is a huge wet **carbon store** (a 30cm deep peat layer over a certain area contains more carbon than the same area of rainforest). Keeping the fen wet encourages plant growth and peat accumulation, removing more CO₂ from the atmosphere, fighting Climate Change.

The calcium in the water causes alkaline conditions and deposits in the form of a crust of whitish limescale called **'tufa'** on the fen surface, encouraging a great biodiversity. The species community of plants and invertebrates (with many now-rare species) has been in place in the fen for thousands of years and is therefore **ancient**, older than ancient woodland. Good grazing or cutting and raking management keep the fen's turf short and biodiverse. It also prevents dominance by reed or invasion by willow trees.

As green areas in the fen's rain catchment are built on, so the essential water supply to the fen slowly diminishes (because roads, roofs and drives **'put a lid over the catchment'** stopping water entering ground and diverting it to drains). Past urban development means many spring/seepage zones around the fen are now dry. Green areas also give the calcium-rich water chemistry. Keeping the catchment areas – including Headington gardens - as green as possible, will keep the remaining fen springs still flowing and fen wildlife thriving. **This is vital in the face of the stress of increasing heat and drought with Climate Change.**

By Dr J A Webb, for Friends of Lye Valley, July 2022