OPINION:

Cornwall's Historic Tin Streams and Mine Sites Under Threat

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Cornwall has a unique and distinctive landscape fashioned by countless generations of farmers and miners, free from interference from Landscape Architects. Its characteristic rugged, unkept, treeless beauty with much dereliction and wilderness is highly valued in a European context.

As a result of mineral extraction very extensive areas have become heavily contaminated with an assortment of minerals of varying toxicity. That pollution has occurred over such a long time span that the flora and fauna of Cornwall has evolved to take full advantage of these seemingly inhospitable areas, such that these supposedly phyto-toxic mining sites are clothed in important, and in many cases unique, wildlife communities. This unique quality is conferred by the way coastal species (e.g. *Plantago coronopus, Armeria maritima, Centaurium erythraea* and *Reseda lutea)* occur alongside heathland (e.g. *Calluna vulgaris, Ulex gallii, Erica cinerea*), scrub (e.g. *Ulex europaeus, Salix cinerea ssp oleifolia*) and rough grassland elements (e.g. *Dactylis glomerata, Agrostis tenuis, Parentucelia viscosa*). The soil chemistry is especially significant in determining the species composition as it governs which species are able to establish on the mining sites and as a rule favours species and communities that have a high Nature Conservation value.

The Red River Valley fits nicely into this scenario and is one of the jewels in Cornwall's crown for a number of reasons. It was one of the most heavily industrialised valleys in Cornwall with, in 1860, approaching 1000 people working in the tin streamworks alone. Add to that the calciners, the foundries, the Bickford-Smith Fuse Factory and the various mines which operated underneath the valley and you have something which is of international importance in historic terms. Indeed, Dolcoath is without doubt the most important mine in the history of hard rock mining in the World.

This industrial heritage has made the valley special for its Natural History. Just over 1900 species have been found in the Red River Valley. That is more than 10% of all the plants and animals that have been recorded living on land in Cornwall and includes an astonishing number of Red Data, Nationally Scarce and Locally Scarce species. It is the soil contamination and the habitats created by the abandoned buddles and slime pits, etc. that have provided the conditions for such a diverse and interesting wildlife. However, it is not just the rarities that makes the valley special but the remarkable associations of plants and animals that have evolved to inhabit the mineralised soils. It cannot be overstated just how important the soil contamination is. It is a wonderful asset and without that pollution the valley would undoubtedly be a very mundane place indeed.

Derelict Land Reclamation Schemes being carried out in this and other areas and the way they are transforming the very fabric of our Mining Landscape into something alien are of much concern to the local community. All too often the landscape is smoothed off, reprofiled, covered with soil and planted with 'wildflower' seed mixes and trees. These include species not found in Cornwall, others not found in West Cornwall, others very rare in Cornwall and not found in the mining areas and other species which are wrong on the basis of ecology. The net result is something incongrous which bears no relation to what was there before and no relation to the surrounding area. It is exasperating, for example, to stand at Brea Adit (Betty Adit) and see what has happened in the name of conservation.

The main reason given for making these drastic changes is that the land is somehow dangerous. "Higher than desirable levels of zinc, copper, nickel and arsenic levels" is not a valid reason for such drastic soil treatment. In fact it is an excellent reason for doing nothing because the Nature Conservation value of the area and in many respects, its Cornish character, is to a large extent determined by the nature of the soil contamination.

So the soils have high levels of arsenic which, as everyone knows, is a very hazardous substance. Indeed, a lethal dose is just half a gram and yet there are thousands of tons of the stuff in the soils throughout Cornwall. Arsenic is an everyday factor in the lives of the populous. It is everywhere in the environment such that one would be hard pressed to find anywhere in West Cornwall that is not polluted with arsenic. If it were as dangerous as has been implicated, there would be no one alive in Camborne, Redruth, St. Day, Porthtowan, St. Agnes etc. Why, with so much arsenic around, does nobody die of arsenic poisoning or even show the symptoms of mild arsenic poisoning? The reason is that most of the arsenic is in the form of mispickel which is a persistent, very insoluble, practically inert substance. The rest of the arsenic is in the form of the oxide which is also very insoluble and is kept locked away in the soils by such factors as the chemical makeup of those mineralised soils, their pH and the mild wet climate.

It has been claimed (*New Scientist*, 30:10:93) that arsenic levels *may* be implicated in the occurrence of very rare cancers. This possibility has been suggested by a study of 40,000 people in Taiwan exposed to high levels of arsenic in their drinking water. The drinking water of Cornwall does not contain elevated levels of arsenic. It seems highly unlikely that a link could be established between these rare cancers and the level of arsenic in the environment in Cornwall due to the complex nature of the contributing factors that determine the onset of these cancers. Even if such links *could* be proven it would be practically impossible to lessen the risks of contracting those rare cancers because there is so much arsenic around. To make a detectable, significant impact on these extremely rare illnesses, practically the whole of Camborne-Redruth, St. Day, Carharrack, Troon etc would have to be smothered by '450 mm' (18 inches) of subsoil. Justifying the smothering of the mining areas with subsoil on this basis is unrealistic. It would be like erecting a ring of sand bags around Carn Brea Castle to protect the Castle from flooding.

Whilst there have been a few cases of animals poisoned by arsenic in the past; for example there is a famous nineteenth century court case about poisoned cattle at Stray Park, Camborne (now a housing estate), the perceived threat of poisoning cannot be justification for turning the landscape into a 'pretty' parkland and artificial theme park on a grand scale.

Typical of what is wrong with Derelict Land Reclamation Schemes are the proposals for Taylor's Shaft, East Pool and Agar. It was one of only three mines in Cornwall with

a total value of output in excess of £2 million (R. Burt, 1987. *Cornish Mines*). The Engine House is an important tourist attraction run by the National Trust which is well frequented by local people at it provides an excellent insight into Cornish Mining, especially as it sits amidst the historic remains of buildings and burrows of that mine. Furthermore, it is part of what is probably the most important Hard-Rock Mining Field in the World for a number of reasons; the area was one of the centres where the Industrial Revolution started, much of the present understanding of the Geology of mineralisation was developed in the locality as were many of the techniques used in Hard-Rock mining throughout the world and the area includes Dolcoath.

Kerrier Groundwork Trust propose to transform that area into something that bears no resemblance to a Cornish Mine. Instead they intend producing an incongruous Park by scraping the mineral soil off approximately a third of the site, replacing it with subsoil and planting it with grass seed (not of local provenance) and 1225 trees and shrubs. It is difficult to justify the planting of *any* trees as that will fundamentally alter the character of what is afterall a Tin Mine. Visitors to Taylor's Shaft should come away with an understanding of what the mine was like when in operation and a crucial part of that educational experience should be to see the mine buildings in the context of the mineralised soils of this remaining fragment of Camborne-Redruth's formerly very extensive mining landscape.

Although there does not appear to be any reasonable justification for tree planting at Taylor's Shaft mention should be made of the choice of trees and shrubs that have been proposed. They include one species almost certainly not native in Cornwall (*Acer campestre*, Field Maple - it is possible it may be native near Torpoint), two which are found in East Cornwall but very rare in West Cornwall (*Viburnum opulus*, Guelder Rose and *Euonymus europaeus*, Spindle) and *Salix caprea* (Goat Willow) which is rare throughout Cornwall and as far as I have been able to ascertain does not grow wild within five miles of the site. *Alnus glutinosa* (Alder) is a species that prefers its feet in water and is best adapted to marshy valley-bottom habitats. *Fagus sylvatica* (Beech) grows best in long-standing woodland sites or as Beech Hedges. *Sorbus aucuparia* (Rowan) is essentially an upland species. It grows on the eastern flank of Carn Brea, near the Castle, for instance. *Betula pendula* (Silver Birch) is a very invasive species once it has become well-established and starts producing a profusion of seed. It is a pernicious weed of heathlands. This Birch is also probably not native in Cornwall as the palynological data for Cornwall indicates it was probably eradicated from the Cornish flora during prehistoric forest clearances. The other species of tree and shrub are very common throughout Cornwall though not necessarily on mining sites.

The proposals to strip the surface layer of the mineralised soils and replace that with introduced subsoil along with wildflower seed mixes are wrong on the grounds of ecology, genetics and aesthetics. The introduced soil will alter the soil chemistry of the site and will favour the more vigorous species as well as some which do not grow on the site. The wildflower mixes used in the various reclamation schemes are equally insensitive as the seed is not of local provenance and includes varieties which are not found on Cornish Mine sites. Why introduce species when what is already there is well adapted to the existing conditions and is typical of mining sites?

As with many of the derelict mining sites Taylor's Shaft could benefit from some very low-key maintenance such as the cutting/spraying of Japanese Knotweed, the removal of

fly-tipping and the clearance of vegetation to allow access to the Archaeological remains. Surely it cannot be right to present this mine to future generations as an artificial 'ornamental garden' or an arboretum!

By being at the forefront of the Industrial Revolution Cornwall's contribution to the development of the modern world has been immense and its mining landscape is worthy of World Heritage status to rank alongside that of the Egyptian Pyramids. That mining legacy should be maintained with due care and sensitivity and not be subject to 'improving' by such Derelict Land Reclamation schemes, otherwise the distinctive character of Cornwall will soon be lost as well as the right to claim World Heritage status.