

58: Cleangold® sluice with magnetic riffles – 1990s research in Oregon

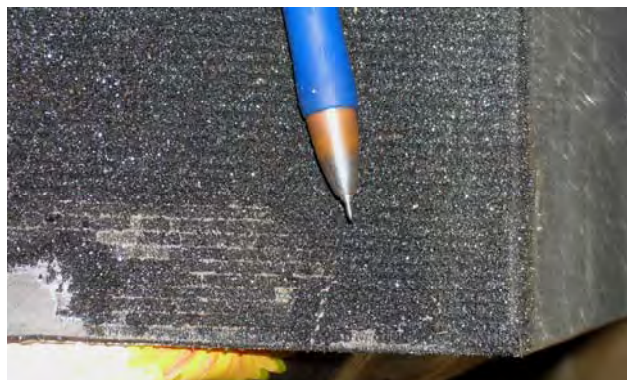


Figure 121. CLEANGOLD® SLUICE
A Cleangold® sluice, after attracting magnetic particles to create corduroy-like ridges that trap fine gold. (photo: Robin Grayson)

The Cleangold® sluice was invented by David Plath of Oregon and patented in 1999 (US #5,927,508). The Cleangold® sluice uses magnetic strips embedded in a non-magnetic rubberised sheet inserted in a plain aluminium sluice to attract, hold and accumulate ferromagnetic minerals in corduroy-like ridges that serve as riffles capable of trapping very fine gold.

Overall the Cleangold® sluice is a low-cost, highly efficient appropriate technology solution to upgrading gold and is capable of recovering much fine gold lost by panning, sluicing and amalgamation [22,23,169-173]. Several different versions are produced by Cleangold LLC equating to a gold pan, a trough and a sluice insert (www.cleangold.com).

Tests briefly mentioned in the paper by Lars Hylander and David Plath [169] claim 60-70% recovery of gold "down to 0.005mm" at first pass, and in a second pass a recovery of "a further 60-70% of the remaining fines". This suggests four permutations for the overall result – 84%, 88%, 91% and 98% recovery.

Operation

The Cleangold® sluice creates a fluidised bed of black sand held in position by complex magnetic fields trapping a carpet of magnetite. Normal riffles are redundant, substituted by a set of corduroy-like ribs of magnetite held by the magnetic fields.

After a few minutes, the magnetic fields attract and hold on the otherwise smooth floor of the Cleangold® sluice a carpet of magnetite particles from the black sand. If magnetite is rare, Cleangold LLC recommends a little black sand is brought from elsewhere to fire up the sluice.

Gold particles are actively trapped by the fluidised bed – not by the magnetic fields but by the fluidised bed being a thixotropic carpet in which heavy particles such as gold are trapped and burrow down by gravity alone.

Cleaning the sluice takes only a few seconds using a plastic scraper to scrape the concentrate into a plastic bin.

Care is needed to decide when the sluice needs to be cleaned. Cleaning too frequently renders excessive the further upgrading required, and cleaning too infrequently risks the sluice being over-full of gold and other extremely heavy minerals whereupon its effectiveness may suffer.'

It is clear the Cleangold® sluice can recover at least 95% of gold present, including most of the very fine gold. It appears to be superior to mercury in recovering very fine gold, and appears capable of recovering a significant proportion of extremely fine gold. Positive comments have been made in several independent reports.

Adoption by placer gold miners

The innovative Cleangold® sluice has great potential for placer gold recovery by artisanal miners, recreational miners and by mining companies. The equipment is new and is currently penetrating artisanal markets in Surinam [22], Guianas [23] and Philippines [36, 170,171].

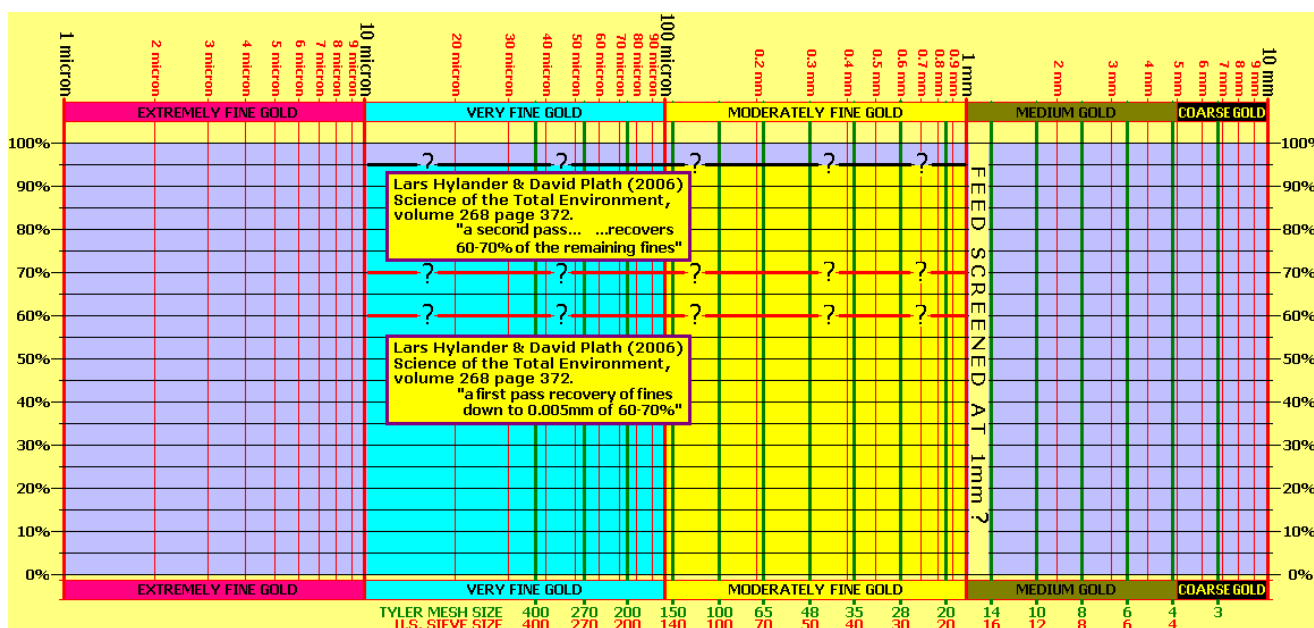


Figure 122. GOLD RECOVERY BY CLEANGOLD® SLUICE - generalised
Recovery of placer gold by Cleangold® sluice according to tests reported by Hylander and Plath [169]. (compiler: Robin Grayson)