Back to the Future: The Resurgence of Physical Separations

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For centuries, mineral beneficiation was through physical separations, including human-based ore sorting where chunks of ore were chosen based on one looking more promising than another.

In the early 20th Century, with decreasing ore grades and the fine nature of minerals, flotation became the “standard” separation process due to the ability to separate fine minerals with similar physico-chemical properties. Physical separation became a more niche technique, with metallurgical testwork often going straight to flotation.

In recent years, interest in physical separations has attracted renewed attention, with enhanced gravity concentrators such as Knelson becoming more common (especially in gold processing), and the recent development and adoption of technologies including the Reflux Classifier and the Multi-Gravity Separator has led to renewed interest in physical separations. This coincided with a focus on responsible energy usage, including reducing comminution energy requirements, leading to attempts to reject barren particles prior to grinding through ore sorting. This computer-based ore sorting now aims at returning to the concept of the human sorters of many years ago, leading to a resurgence in the perceived value of physical separations.