

Exploration success – Some lessons learnt over the past half century

Richard H Sillitoe*,

*Independent consultant, London, United Kingdom, Email: aucu@compuserve.com

Although there is no unique way of achieving exploration success, it is clear why there has been less of it lately: worldwide deterioration in the regulatory framework because of reactions to increasing resource nationalism and social opposition, and less fieldwork per exploration dollar spent. This situation is further compounded by a reduction in greenfields exploration for a variety of widely discussed reasons imposed by mining executives and investors.

A number of factors have long been accepted as fundamental to exploration success. On the management side of the equation, genuine support, long-term commitment, and adequate and stable (but not excessive) funding are widely touted, whereas individual practitioners need to be committed to discovery, geologically competent and well informed, scientifically innovative, and physically and mentally fit for fieldwork. The resulting exploration programs should provide definitive tests, maintain focus, prioritize key tasks, show persistence, and honestly assess results however this motherhood phraseology is to be interpreted. Inspirational team leaders will undoubtedly maximize the chances of positive outcomes.

During the past two decades or so, however, it has become increasingly evident that geological concepts, typically allied to ore deposit models, are having an ever greater influence on discovery, particularly of wholly or partially concealed ore. Concepts that integrate disparate observations and link different mineralization styles are especially valuable and quickly become mainstream tenets. It is important to emphasize that such concepts are commonly formulated by explorationists with broad purviews of ore deposit geology.

Although there is undoubtedly still a stock of partially exposed orebodies awaiting discovery, especially in highly endowed, emerging, and frontier metallogenic provinces, increased effort is clearly being directed to concealed targets as witnessed by much greater drilling depths, for example in the porphyry copper environment. It is believed that concept-driven, predictive exploration, employing the best up-to-date science, is now a basic requirement for meaningful subsurface targeting. Field-based observations and ideas, and critically those stemming from previous drilling campaigns, are essential if targeting is to avoid becoming just a desk-top exercise. Unless it is an outstanding geophysical or geochemical anomaly directly relevant to the commodity sought, reliance on measurement of individual physical or chemical parameters and other supposed silver bullets will rarely result in let alone sustain discovery.

Experience is a major, long-standing, but unquantifiable contributor to discovery and, notwithstanding initial attempts to apply machine learning to exploration, it will remain so because of the simple fact that no two orebodies are alike. Experience facilitates geologic analogy, whereby previously observed orebody features can help with understanding new prospects, and preliminary appraisal of the diverse (mining, metallurgical, infrastructural, economic, political) criteria involved in making ore.