The truth about Witwatersrand "carbon"

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Arguments persist whether the so-called Witwatersrand (WR) "carbon" represents kerogen, the fossil remains of microorganisms, or solid bitumen, the remains of once liquid hydrocarbons. Nearly 40% of WR gold is hosted by carbon.

Microorganism precursors of kerogen and bitumen are well documented in Precambrian metasediments; some survive unevolved today, and are capable through processes of biomineralization of concentrating gold to ore grade. Bitumen, although of widespread occurrence in mineral deposits, is not particularly renowned (outside of the WR?) for its ability to concentrate gold.

Evidence of extensive microbial activity in Precambrian continental siliciclastic sequences is increasingly recognized; likewise the reality and versatility of microbially-mediated biochemical cycles of gold.

Proponents of genesis of WR gold by hydrothermal processes have yet to supply convincing evidence, for example, that: liquid bitumen sourced cm-thick highly auriferous carbon seams upon vast paleosurfaces in the WR; pebbles, which depress carbon seams, are optical illusions; bitumen, but not kerogen, commonly occurs resedimented in lag gravels; bitumen readily sequesters gold; cyanobacterial look-alikes are readily duplicated with bitumen in the lab.

Nearly everyone agrees that WR carbon is of biogenic origin. However, perception of its common condition as a mixture of kerogen and bitumen is slow in dawning. The mix is common enough in Phanerozoic source rocks where liquid hydrocarbons have been generated in, or migrated through, lithologic intervals of interest. In the WR goldfields this phenomenon may camouflage, but it cannot obscure the reality of the kerogen constituent in WR carbon, nor the fact that syngenesis was of paramount importance in the genesis of WR gold. It is therefore scarcely surprising that a substantial body of evidence strongly indicates that much WR carbon is indigenous to the host siliciclastic sequence.