

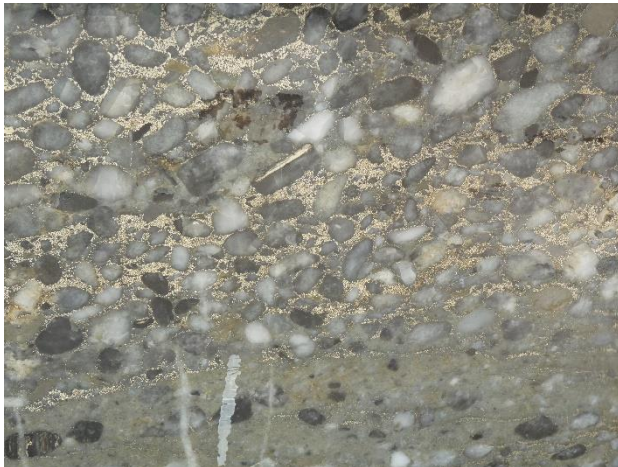
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The Witwatersrand Goldfield - from Geological Origins to Environmental Impacts of Mining

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The Witwatersrand Goldfield has produced about 52 000 tonnes of gold or one third of all gold ever produced. A brief overview of the geology and origin of the Witwatersrand Basin and its contained, quartz-bearing, auriferous conglomerates is presented. The geological and sedimentological features including ore shoot distribution and possible origin of some of the iconic gold-bearing layers (reefs) such as the Main Reef Leader, Carbon Leader and Venterdorp Contact reefs is presented (Figs. 1 and 2). Highlights of the early mining history including that of discovery, the “Randlords” and their contribution to developing the huge gold mining industry, metallurgical breakthrough’s including the introduction of cyanidation for gold extraction etc., are briefly discussed. The early history and geology of some of the great mines that operated within some of the major goldfields of the Witwatersrand basin are presented.



The issues of deep level mining of narrow reefs (often less than 1 metre) under extreme pressure and temperature in the world’s deepest mines (>4km) are discussed. Examples of exploration methods and in particular gravity, magnetics and seismics used in the discovery and mining of various goldfields, are presented. Finally the main environmental impacts after 130 years of mining of the world’s largest gold deposit are briefly reviewed.

Figure 1: Typical auriferous pyritic quartz pebble conglomerate

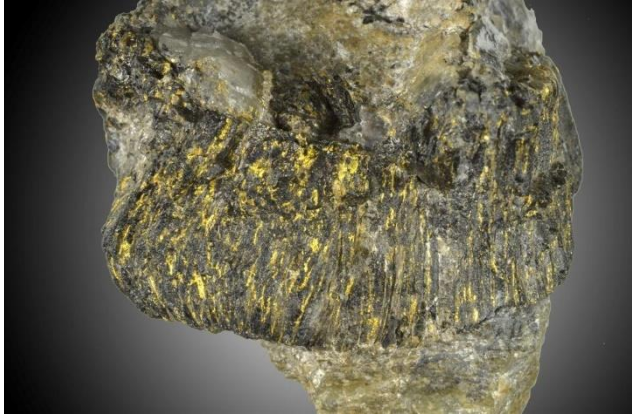


Figure 2: One centimetre thick Carbon Leader Reef with columnar carbon and abundant visible gold.

