



## Looking Back at Peak Global Production of...Gold

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Yesterday the President of the largest gold mining and production company, [Barrick Gold](#), noted that after ten years of declining production it is time to recognize that the world has seen the peak in gold production. To maintain production ore is being mined with increasingly less gold in it. (The grade of the ore, or metal content, defines whether it is profitable to mine.)

Ore grades have fallen from around 12 grams per tonne in 1950 to nearer 3 grams in the US, Canada, and Australia. South Africa's output has halved since peaking in 1970.

The supply crunch has helped push gold to an [all-time high](#), reaching \$1,118 an ounce at one stage yesterday.

Gold serves two purposes. Firstly, it has provided down through history a form of currency, though it is not clear whether it was [Croesus](#) or the [Egyptians](#) who used it in trade. Both date back to around 5-600 B.C., and gold coins have flourished since that time. (Before then gold was mined around Mestia, in what is now Georgia, back at the time of Jason and the Golden Fleece (before 1300 B.C.) and used for ornamental wear and art objects.) But gold also has a useful function [as a metal](#).

Gold conducts electricity, does not tarnish, is very easy to work, can be drawn into wire, can be hammered into thin sheets, alloys with many other metals, can be melted and cast into highly detailed shapes, has a wonderful color and a brilliant luster. Gold is a memorable metal that occupies a special place in the human mind.

It is even, on occasion, used as a roofing material.



*Gold roof to the Small Gold Tile Hall of the [Ta'er Temple](#) in Qinghai Province, China.*

As with peak oil, the fact that global production has peaked does not mean that there is no gold left to mine. Rather it means that less gold will be mined each year into the future. It will likely, in time, bring back into debate the environmental costs of mining.

For there are deposits of gold still in the ground that are being not mined, in part because of the environmental cost. If you go, for example, to the [Malakoff Diggins](#) in California (a state park north of [American Hill](#)), you will find tall sandstone cliffs that used to be mined using streams of water from large monitors. However, in excavating the rock it was also disintegrated, and the clay particles were carried down into the Sacramento River, gradually filling the river bed, to the point that in heavy rains the river flooded the surrounding communities. Thus, back in 1886 Judge Sawyer restricted the practice, which largely fell into abeyance. But the gold is still "in them thar hills." Similarly if one goes up to the valleys outside Fairbanks [in Alaska](#), there is gold in the gravel beds – but is has been largely too expensive, both commercially and environmentally, to recover to this point. One of the more recent discoveries in Alaska has become known as the [Pebble Mine Project](#). While there may be up to 3 million ounces of gold in the region, there has been [strong opposition](#) to development--even though that development continues.

Gold has been a valuable mineral for a long time and for nations all around the world. All the good and easy places to find it, therefore, have been sought after and largely found. The gold deposits that are worked have become smaller of lower value and found in places that are harder to get to. With lower availability, greater demand and higher price, it became more practical to mine and process lower grade deposits and to go deeper into the Earth for the higher grades. Mines in [South Africa](#) and in [South Dakota](#) have been worked down to more than 2 miles below the surface, to recover the ore. And techniques have been developed that recover it in even very small quantities – 3 gm per tonne is an ore that contains very little gold (3 divided by 1000 = 0.003 kg divided by 1000 = 0.000003 tonnes or 3 parts per million). So, while miners can still find the odd nugget when they pan for gold in streams around the country (and there are lots of maps available to tell you [where to look](#)), for the large scale levels of production that make a significant impact on the market, you need large deposits of gold with the potential for greater yields, and those places are getting harder and harder to find. And even as one goes deeper, the grade of the gold doesn't necessarily continue.

[Harmony Gold](#) said yesterday that it may close two more mines over coming months due to poor ore grades.

Gold production in South Africa had [fallen 9.3% year-on-year](#) last September--this in the country that once led the world in gold production.

We haven't run out of gold yet

Barrick produced 1.9 m ounces of gold last quarter, down from 1.95 m a year earlier. Costs have been "trending down" to \$456 an ounce, though rising energy prices pose a fresh threat. Total reserves are 139 m ounces, far ahead of rival Newmont Mining at 86 m.

But production will continue to fall as the reserves become even harder to extract. Beyond a certain point there is not a lot that technology can do, except perhaps to fund ways of getting gold out of veins that are too small and costly to mine at present. But that won't yield the millions of ounces that are needed to maintain supply. And the industry was not one, in recent years, to invest in that future. When gold can be recovered by [soaking crushed rock in a solvent](#) at

relatively low cost, there is not a lot of incentive for new ideas. The days of the industrial innovations that used to come from the research labs in South Africa are likely now over.

So, as the oil industry starts its travels down a similar path past peak and into decline, there are a couple of thoughts I would offer.

Firstly it could be pointed out that the gold industry has been able to see the declining production and lack of available prospects for some time. But it is only now, some 9 – 10 years after the decline started, that the industry is publically recognizing the problem.

Secondly one might ask whether there should not be an agency of the government that can independently warn the government and the nation of this before it happens, so that either better mining methods, access to restricted reserves, or the development of alternate materials could be hastened. Well actually there was--it was called the U.S. Bureau of Mines, and all those tasks were in its charter. But the mining community is a small one, and has not nearly the clout or popularity in Washington that it is thought to have. Thus, in 1996 [the agency was closed](#).

Thirdly, even though the story is out there it is unlikely, for a while, to get much media attention, and the vast majority of the world's population will not either know of the predicament that is now approaching, nor understand why it is going to be something that will impact many aspects of their lives. Until, of course, it does.

And of course gold is only a pre-cursor of other minerals that will soon run short. Few folk realize the role that metals and minerals play in providing their lifestyle, and do not recognize that the value of many metals comes, in part, because there is nothing that can substitute as well for that particular metal in doing a particular job. Unfortunately, doing something about it requires vision for an industry that is not favorably viewed by much of the population. It will be interesting to see if that perception changes, or if the industry becomes the target of blame as shortages lead to even further cost increases.

And then, of course, will come oil .....



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