IN PRAISE OF THE GOLD PAN

When one thinks of what optimizes prospecting over its long history, the standout feature and still the most powerful iconic symbol of prospecting has to be the humble gold pan. This simple uncomplicated dish, is dirt cheap, is highly portable, light weight, has no moving parts, cost nothing to run, is hand powered and is incredibly efficient. The gold pan is the equivalent of the stethoscope in medicine and the magnetic compass in navigation, in terms of its simplicity, power and effectiveness as a front line professional tool.

A measure of the gold pan's power and efficiency is the fact that it can recover gold particles 0.125 mm in size from 5 kilograms of sample in less than 3 minutes. Each gold particle of this size represents one gold particle efficiently separated and recovered from one billion other particles. Each such particle represents a measurable gold grade of one part per billion (1 ppb), a grade that even the most expensive and powerful analytical laboratory methods would find difficult to duplicate.

Knowing the size of the particulate gold and the original sample weight, allows for a meaningful numerical assay grade to be calculated relatively easily. This is an incredible feat. Even more incredible in that it is achieved in the field, within a few minutes, at no cost, and by a minimally trained operator.

Apart from determining the gold grade, the pan also allows the operator to examine the number, size range, nature and character of the recovered gold particles and derive a great deal of additional valuable information from very large samples (10-20 kg). This is currently unachievable using any modern alternative methods.

When used in conjunction with a dolly pot, the grades of hard rock samples can be determined just as readily as for loose soil, sediment or loam samples. It can also be used to determine how representative the sample is of the material is from which it is drawn, and how large a sample must be in order to be identified as being "**a representative sample"**. A sample is only "representative" if repeat samples of the same size, drawn from the same material are capable of repeating the same result. This property of repeatability of the results is a function of the sample size, and the gold particle size.

More complicated gravity devices such as sluices, dryblowers, jigs, and shaking tables are all variations of the same principle just scaled up and modified to allow a continuous sample feed. The main principle behind the gold pan and other mechanically-based separation devices is the efficient use of gravity and density differences to allow effective particle separation. Gravity is the key. In the absence of gravity the gold pan won't work. It is much harder the pan for gold on the moon because gravity is so much less than on earth. It is this principle that forms the basis of centrifugal gravity devices like Knudsen bowls and Knelson concentrators, which spin in order to artificially increase the gravitational effect through increasing centrifugal force.

The skilled operator of the gold pan, by sampling the downstream sections of a drainage system can tell if there is any gold to be found upstream in that entire basin. One large sample, effectively panned can register the presence of a gold source as far as 20 kilometres away, somewhere upstream and upslope from the sample location. Furthermore by selective use of the gold pan, the location of that gold source can be progressively trace back, narrowed down, pinpointed within a few meters and identified within a matter of a few hours to a few days work. This means that a single large sample from a drainage channel,

when panned can recognise the existence of a gold source in an area of over 100 square kilometres, and can be used to systematically trace that gold back to its source. This is a phenomenal result for a simple bowl and even with today's state-of-the-art exploration, chemical/geochemical and geophysical technologies, we would be hard pressed to do better. The act of panning undoes the natural dilution effect of accumulating stream sediment systems by reconcentrating and revealing any diluted gold. The cost effectiveness of achieving this through gold panning is unmatched.

The concentrate above, if panned from an original one kilogram sample, would have an approximate grade determined as follows:

Au particle size	Number	Unit Grade (g/t)	Sum Grade (g/t)
1.00 mm	1	1.54	1,54
0.75 mm	1	0.65	0.65
0.50 mm	10	0.19	2.00
0.25 mm	4	0.024	0.10
Small squares	10	0.20	2.00

TOTAL Au GRADE = 6.30 g/t

The amount of additional information observable in a panned concentrate is worth the cost of a hundred assays and is unattainable by any other method. Not only does it allow you to determine a numerical assay grade, whether the sample is representative of the material from which it was drawn and what the sample size needs to be in order to be representative and reproducible. It tells you the size of the coarsest gold, the gold size distribution, that the gold is nuggetty and identifies the smallest gold particle size recoverable by gravity. For the concentrate example pictured, it also tells you that the gold is primary gold, that it is not associated with laterites and breakaways but associated with striated pyritic sulphidic quartz veins and alterations zones, hosted in metabasalts of a particular type and that you are close to what should be an outcropping source.

Other deductions suggest that more than 50% of the recovered gold is coarser than 0.25 mm (250 microns), and recoverable by a sluice, but possibly as much as 50% of the fine gold has been lost in panning and that therefore the calculated grade would be higher by a factor of about one third. This fine gold would likely be lost in a sluice and might require jigs for efficient recovery. None of this information can be deduced from a chemical assay of the same material and you have not destroyed any of the gold in the process.

What of the future? The gold pan has a secure future as a frontline tool in prospecting at least. Regrettably it does seem to have gone out of favour in company-based mineral exploration and that is their loss.

It can be argued that gold panning has found more gold deposits than any other single technological development. It can equally be said that more gold has been walked away from (left undiscovered), than has ever been found through panning, largely because of the failure of operators to effectively make the most of the information revealed in the dish.

As a cost effective exploration tool the gold pan, effectively used by an experienced operator, is an unbeatable exploration tool and will remain so well into the future.