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HALLGARTEN & COMPANY

Portfolio Strategy

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Model Mining Portfolio:

Gold Glimmers in the Dark

Performance Review – December 2018

Model Mining Portfolio

Gold Glimmers in the Dark

- **Gold was the big winner from global market turbulence, though not on the scale that its boosters would have us belief**
- **Silver has been dragged up in gold's wake and still deserves a higher valuation**
- **Base metals have been soft but not beaten down as much as one might expect if global equity markets are signaling a major downturn**
- **Palladium keeps hitting the highs in a stunning run bringing good news for financing new developers in the metal**
- **Broader markets took a turn for the worse in December which made it hard for the already battered mining sector to escape further price reductions**
- **Battery metals' prices remain down in the dumps with negative effects for a swathe of stocks trying to advance projects**
- **Vanadium took a beating during the month as a result of the inevitable pullback after being overhyped for quite a while. You broke it you own it. You know who you are.**

A Better Year in 2019

To the dedicated gold bug only gold really counts so they at least are happy campers at the turn of the year. Of course the swivel-eyed proponents of the metal still aren't getting the $4,000 or $10,000 that they pine for.. give us a few months… it will happen.. promise.…

Besides that crowd everybody else is pretty down in the mouth (except Palladium's proponents). We must confess to having "sold too soon" when we departed from our position in the physical ETF in the metal. The divergence in destiny between Palladium and Platinum in 2018 was one of the great head-scratchers of the year. We heard complicated theories to justify the divergence but none were really persuasive considering the way these two metals are joined at the hip.

The base metals have severely disappointed and perversely this justified in retrospect those players that had steered clear of Zinc developers/producers but it has also killed off any chance of greenfields or explorers in these metals. Copper was supposedly in massive "hidden" deficit according to its boosters but one would not have known that from the price moves. The Chinese definitely tried to weaponise the metal and have succeeded in ensuring that most explorers get little traction and thus the pipeline for 5-10 years out looks rather dry. Nickel got scant benefit from the battery metal hype on the way up and yet came to suffer the negative blowback when battery enthusiasms paled.

Hallgarten & Company - Commodity Estimates

	Unit	End 2018	End 2018 Actual	Undershoot/ Overshoot	End 2019	End 2020
Lead	lb	$1.00	$0.910	-9.0%	$1.02	$1.02
	tonne	$2,204	$2,006	-9.0%	$2,248	$2,248
Zinc	lb	$1.37	$1.150	-16.1%	$1.50	$1.75
	tonne	$3,019	$2,535	-16.1%	$3,306	$3,857
Copper	lb	$3.05	$2.720	-10.8%	$3.20	$3.65
	tonne	$6,722	$5,995	-10.8%	$7,053	$8,045
Gold	oz	$1,250	$1,280	2.4%	$1,230	$1,190
Silver	oz	$15.50	$15.50	0.0%	$16.80	$18.00
Platinum	oz	$865	$788	-8.9%	$910	$950
Palladium	oz	$1,150	$1,270	10.4%	$1,150	$1,150
Uranium (spot)	lb	$44.00	$28.50	-35.2%	$40.00	$55.00
Antimony	tonne	$8,300	$7,800	-6.0%	$8,800	$9,100
Tungsten APT	MTU	$315	$277	-12.1%	$330	$410
Tin	tonne	$19,500	$20,950	7.4%	$21,500	$22,800
Cobalt	lb	$27.33	$33.74	23.5%	$36.00	$39.00
Vanadium	lb	$29.50	$16.72	-43.3%	$25.00	$31.00
Nickel	lb	$5.70	$4.83	-15.3%	$5.80	$6.30
	tonne	$12,563	$10,645	-15.3%	$12,783	$13,885
Moly	lb	$11.20	$10.89	-2.8%	$11.80	$13.00

The two battery metals in our estimate universe, Cobalt and Vanadium both had swingeing retreats. That of Vanadium was more dramatic as its rise and fall all happened within the space of the year. Cobalt on the other hand was in the doghouse for most of the year.

Our outlook is bullish for 2019 despite the plunge. It is interesting to note that the global equity market swoon of the last month did not carry base metals appreciably lower and only really seemed to have a major effect on gold (and thus silver) sentiment. If recession or a global market crash was imminent then base metals would have been much lower. It could even be argued that these metals were canaries in the coal mine (to mix a metaphor) having experienced their most significant price falls in the middle of 2018.

Gold does not have significant upside from here. Silver may do however. Base metals should advance and possibly retouch their 2018 highs but those highs may prove to be resistance levels for the next 12-months. Specialty metals will recapture their mojo. Battery metals we discuss below but we are not bearish on their price outlooks just on the fortunes of the players involved.

A Year in Battery Metals

The year that has just ended redefined tedium when it came to the subject of EVs and their potential trajectory. The boosters have engaged in a spiral of trying to better each other on ever more grandiose claims of the uptake of these type of vehicles and have linked the fate of a handful of metals to this cause.

While 2018 was disappointing overall for battery metals (excepting Vanadium) the last few months started to see an interesting change in dynamic with in-the-know people focusing on what Western auto manufacturers were (or were not) doing in the EV space. So far Big Auto has been a mere dabbler in EVs but certain other dynamics are coming into play which are focusing minds on not only when Big Auto (particularly the US sub-species) will head more seriously in the EV direction or whether some of the biggest players will even survive.

The sector is being battered by a number of other factors such as changing consumer tastes, uncertain signals on whether diesel has a future, rising interest rates, rising default rates on older auto loans, tighter financing conditions in some countries (the UK being an example), slow provision of charging points making potential EV buyers wary of making the jump, high costs of EVs, and then there is a wariness in the general public as to how much of the hype is hype. The result is drivers seemingly making decisions to wait-and-see.

Many analysts in the OEM space had predicted that peak auto sales would be in 2022 but now in light of the deteriorating conditions, consumer standoffishness and other factors, the peak may now be behind us with 2018 having been the high watermark.

Little focus has been paid on how the deteriorating financial condition of some of the majors might impact (or restrain) their move into EVs. Retooling is not cheap or easy. Other dynamics have been given almost zero consideration and prime amongst those is the fate of the enormously lucrative spare parts business which in theory should shrink with EV's supposed "less moving parts" theory. Parts have cross-subsidised the main business of many of the majors for a long while.

On top of this there is the confused situation at Renault/Nissan and renewed concerns about the financial health of General Motors.

What does this spell for the battery metals players? We have seen Lithium, then Cobalt, fall from grace (pricewise) and a reactivation of enthusiasm for blue-sky stories looks somewhat unlikely. If there are 150 listed Lithium stories (who knows?!) then there is a need for less than twenty, we would venture. It is clear now who the likely top ten are, then there is a struggle between the next twenty to thirty to make it into the next ten producers (and like the Rare Earth space there will be surprises in which of them will be the eventual survivors). That leaves 100 plus names destined for the scrapheap of history. Cobalt is a smaller number of contenders but still numbering more than fifty listed wannabes with maybe only ten with possible production destinies. The vast bulk of production for the future needs will most probably come from by-product from Nickel mines and currently the sums are just not adding up for Nickel mines of consequence to be developed with Nickel and Cobalt prices where they currently stand. A chicken-and-egg situation…

Thus our view of 2019's outlook is selectively upbeat. Lithium and Cobalt prices should trend higher but this will not refloat boats that are terminally holed. The task now will be to do what those watchers of the Rare Earth space were forced to do, pick out the names that will have long term staying power and credibility and let the stragglers go to their fates.

Portfolio Changes

There were no portfolio changes in December after the wave of purchases and sales in the prior two months.

The Portfolio Move

The cash balance remained unchanged at $202,000 at month end. Dire market conditions pushed the Model Mining Portfolio down again from $4.19mn to $3.92mn at year end.

EuroManganese

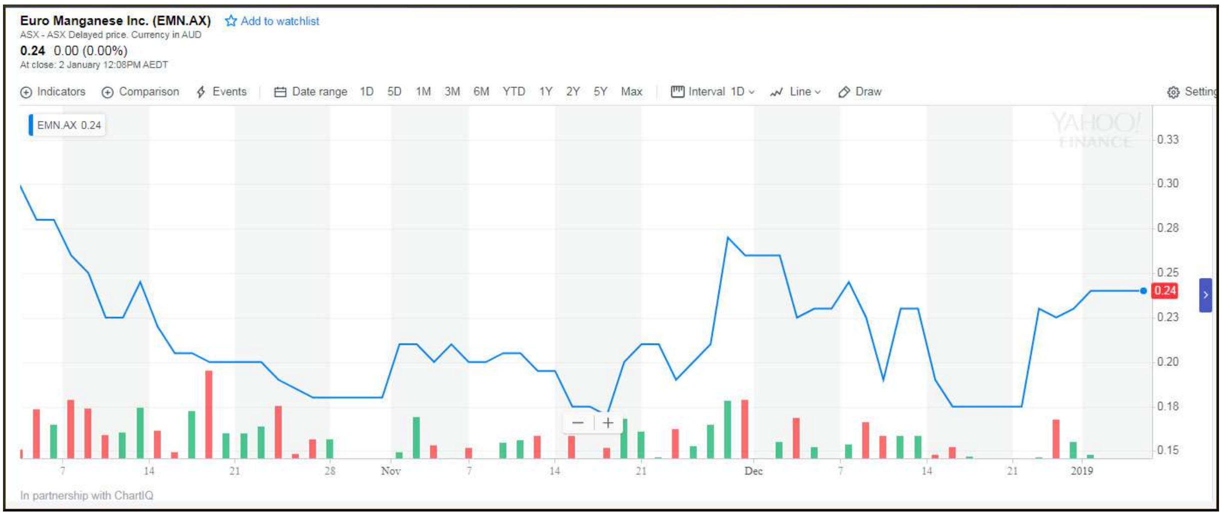
The pace of change in the battery space has moved up quite a few gears since 2017. Lithium plays first proliferated (and then came tumbling back to earth) and then Cobalt became the word on everyone's lips as the Cobalt crisis moved into centre stage and focusing minds on supply issues in the battery space. Manganese began receiving increased attention for its potential to reduce the Cobalt component in various battery types using that metal via the rebalancing of the relative weightings of elements in the battery cathode formulations, particularly Nickel/Cobalt/Manganese in NMC batteries.

Euro Manganese is a company we first encountered in its guise as an unlisted developer, back in February 2018 at Argus Metals' London Battery Metals conference. The company had spotted the connection between Manganese and the EV surge early on and decided to pursue the metal for its leverage to the revolution in battery metals. The company eventually got itself listed on the ASX and TSX in September of 2018.

The company made the mistake of trusting that an issue in Canada would be bedded down in serious hands. Instead most of the recipients turned out to be flippers, however conversely in Australia most of the recipients turned out not only to be holders, but accumulators, and thus most of the stock has migrated Downunder in the first few months after the placing.

The price chart on the following page is an indictment of the TSX-V as a market for serious stocks in recent listings.

Whereas the ASX chart looks like this:



One might almost think it the chart for a totally different company.

Strategy

The strategy is to workover a manganese-rich tailings deposit located 90km east of Prague, in the Czech

Republic. The Chvaletice Manganese Project is focused on the development of a new producer of ultra-high purity manganese products in Central Europe. A number of battery mega-factories are being planned with relatively easy trucking distance of the project.

The presence of manganese and iron minerals was first recorded near the present-day village of Chvaletice in the 1800's, and sporadic, localized mining of the Chvaletice ore body took place during the early 1900's. Starting in the 1930's, ore was processed for the recovery of manganese and railed to steel mills in Czechoslovakia and Germany.

Between 1951 and 1975, the focus turned to the extraction of pyrite, which was used to produce sulfuric acid for various industrial clients. The waste from these operations created the three existing Chvaletice tailings piles that form the deposit. The piles were rehabilitated with a layer of top soil and trees planted between 1975 and 1983.

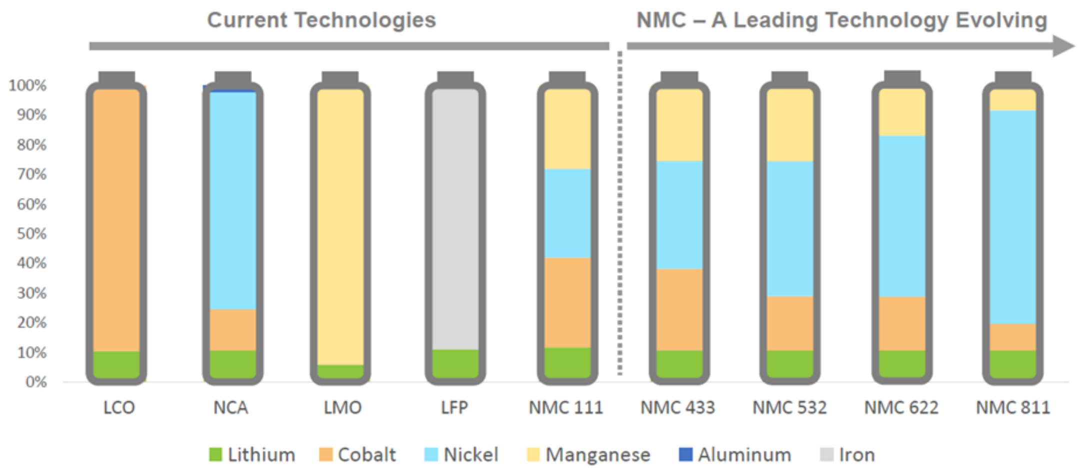
In the late 1980s, Bateria Slany, a battery producer owned by the Czechoslovakian government, undertook extensive studies of the tailings to determine the feasibility of producing manganese dioxide for the production of dry cell batteries. Although studies confirmed the presence of a significant and economically attractive manganese carbonate resource, they halted development following the tumultuous political events in 1989, which brought about the end of communism in Czechoslovakia. The deposit lay dormant until its mineral rights were granted in September 2014 to a Czech group of companies. The rights were then consolidated in a jointly-owned holding company, Mangan Chvaletice sro. In May 2016, EuroManganese acquired 100% of Mangan Chvaletice sro.

Manganese Usage in Batteries

Manganese has long been employed in that most prosaic of battery formats, the alkaline battery (think AA or AAA). There is nothing new in that but it does provide a constant demand for manganese and has done for over half a century. It is also one in which little effort goes into the recycling of the Manganese metal in batteries.

Manganese is a key ingredient in the cathodes of two of the most prominent up and coming electric vehicle battery types: the nickel-manganese-cobalt (NMC) battery, and the LMD/LMO battery.

As the cathode markets develop toward NMC, it is felt by many observers that the LFP format favored by Chinese manufacturers, with lower suitability for electric vehicles will lose market share. Current NMC ternary lithium-ion batteries from South Korean and Japanese makers typically employ a ratio of 60% nickel to 20% manganese, and 20% cobalt (6:2:2), but as that ratio moves to 8:1:1 in 2018 and beyond, the cathode is a key element in achieving vast cost efficiencies. At the moment, the NMC battery mode is setting the industry standard and is likely to be at the forefront for at least five or ten years.



Source: HIS Markit

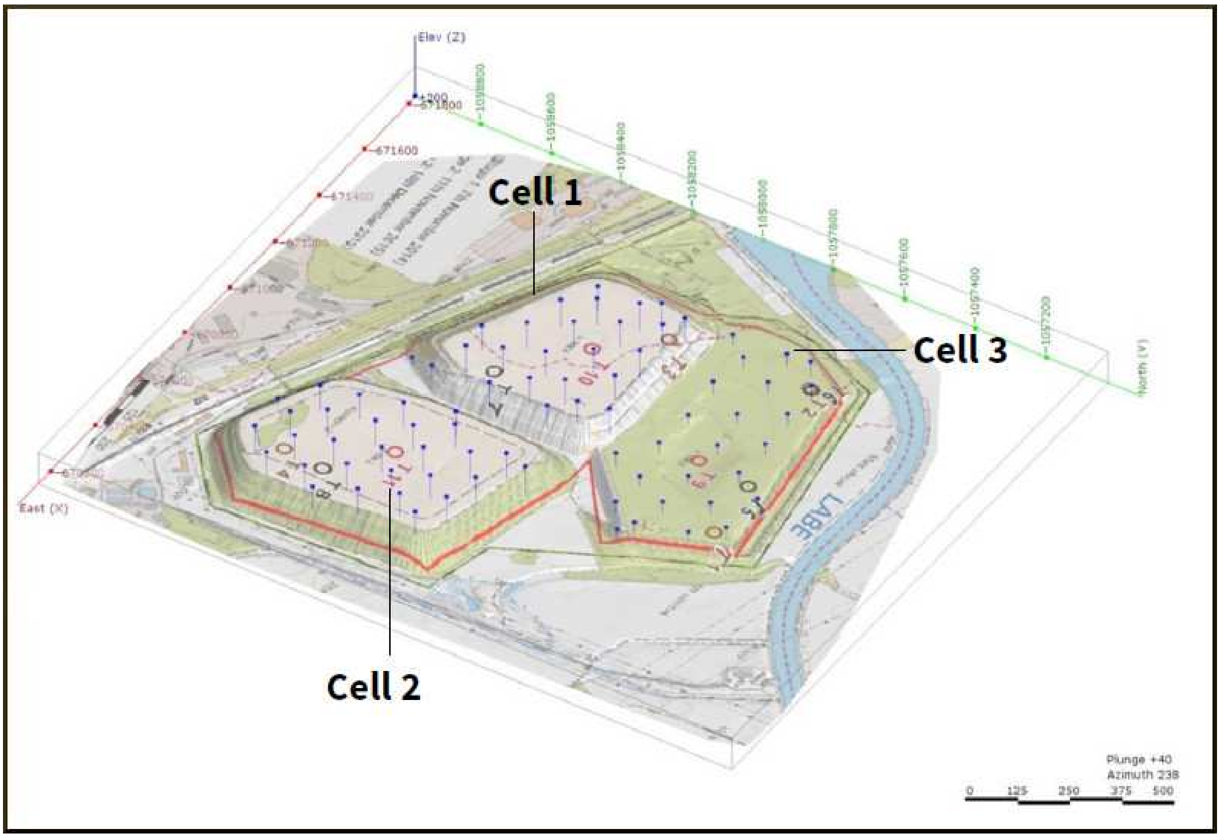
Electrolytic Manganese Dioxide (EMD) is a vital ingredient in the production of alkaline batteries with total annual production capacity estimated by the International Manganese Institute at roughly 430,000 mt. Battery consumption of Electrolytic Manganese Dioxide (EMD) has been predicted to be fastest growing segment of manganese production with a CAGR of 5.1% from 2015 to 2022.

Work Done & Resource

The manganese resource at Chvaletice is contained in three adjacent flotation tailings piles that were emplaced on flat terrain immediately below the site of a flotation mill site, adjacent to the former open pit mine. The tailings consist of sandy to fine greyish material containing approximately 7.5%

manganese.

The aerial representation below displays the proximity to both the rail facilities and the river. One of the side benefits of reprocessing these tailings is going to be the reduction in leaching of dissolved metals into the Labe (Elbe) River, one of the major rivers in northern Europe.



Extensive drilling, trenching and bulk sampling of the Chvaletice tailings was undertaken by Bateria Slany between 1986 and 1989. Between 2014 and 2016, Euro Manganese conducted preliminary auger drilling and backhoe pit sampling to assess the qualitative aspects of the tailings and to conduct exploratory metallurgical tests.

In 2017, the company conducted an extensive Sonic drilling campaign to evaluate the quantitative and qualitative features of the three distinct tailing deposits, to form the basis of a preliminary mineral resource estimate and to collect a representative bulk sample to conduct in-depth metallurgical studies, including a pilot plant high-purity manganese electrolytic metal production test, as well as exploratory high-purity manganese sulfate production tests.

In December of 2018 the NI43-101 compliant Resource Estimate prepared by TetraTech (expanding upon one that had been published in April of 2018) was released:

Tailings Cell #	Classification	Volume (m³)	Tonnage (metric tonnes)	Dry In -situ Bulk Density (t/m³)	Total Mn (%)	Soluble Mn (%)
#1	MEASURED	6,577,000	10,029,000	1.52	7.95	6.49
	INDICATED	160,000	236,000	1.47	8.35	6.67
#2	MEASURED	7,990,000	12,201,000	1.53	6.79	5.42
	INDICATED	123,000	189,000	1.55	7.22	5.30
#3	MEASURED	2,942,000	4,265,000	1.45	7.35	5.63
	INDICATED	27,000	39,000	1.45	7.90	5.89
TOTAL	MEASURED	17,509,000	26,496,000	1.51	7.32	5.86
	INDICATED	309,000	464,000	1.50	7.85	6.05
COMBINED	**M&I**	**17,818,000**	**26,960,000**	**1.51**	**7.33**	**5.86**

In 2019, the company's next moves are intended to be:

- Establish a demonstration/training pilot plant in the Czech Republic
- Determine product range to be produced (HPEMM and/orHPMSM)
- Secure environmental and development permits
- Complete feasibility study
- Offtake agreements and initiation of project financing

We had a meeting with the company in mid-November and this inspired us to add it as a **Long** in the Model Mining Portfolio. We have chosen to denominate the stock in AUD and use the ASX quote due to the short-termism displayed by Toronto "investors" in the wake of the original listing.

Parting Shot

Mastering "Social Media" is seen as the Holy Grail of mining IR these days. As most things in the repertoire don't seem to be working or are blocked by government/regulator interference then Social Media remains an Everest beckoning companies to scale its heights. Just as one needs a Sherpa to lead one into the Himalayas, one needs a Social Media-savvy IR person to lead one across the treacherous territory to the promised land of hordes of followers who pile into the stock at management's drop of a tweet. Alas, tis not so simple.

It was only a few years ago that the main venue in Social Media for touting one's virtues was Facebook. Linkedin was seen as being for longer non-promotional musings while Twitter was "past its prime" and had never had great adoption anyway. However, times change. In the interim Facebook has faded fast. Sure it works for global brands and even niche brands but it is very much a consumer targeted vector rather than one for investors. Information overload combined with users wanting to discriminate between their "friends, families, old schoolbuddies" demographic and a stream of fake news and mining company press releases and has resulted in companies in the mining space dropping or downgrading their focus on Facebook like a hot potato.

Twitter began its renaissance a couple of years ago around about the time that POTUS (or wannabe POTUS as he was then) decided it was the best blowhorn for his campaign to employ. Whether mass adoption by the mining community was coincidental or as a result is unclear but it became the place to be. The length of tweets was expanded and thus it became the perfect place to put out a whole thought rather than just an truncated soundbite.

Linkedin also came to be seen as a good place to post news and developments. The problem here is that targeting an audience is tougher to do. Members are less inclined to link to companies, preferring individuals. Many members don't seem to either want or know how to join groups. Many groups are slackly managed (the Tungtsten (sic) group has been misspelled in its title for nigh on a decade) and requests to join can lay unnoticed for months if not years. Members only see the postings if they go to the group. One also tends to be linked to other professionals "in the trade" rather than to end-investors.

Twitter however rides high these days. It has not been lost on a small group of players that it presents a very interesting and legal way to get around CASL and GDPR strictures that have brutally curtailed the ability of miners and broking firms to interact with their traditional "clientele". Nowadays an IR person who cannot "do" social media is as useless as a bicycle with square wheels. Yet many Twitter accounts lie becalmed. The saddest indictment of sleepy management is to see either no tweets ever on an established account, or last tweeted in June of 2013! A mining company that does not have its own handle is not only incompetent but exceedingly remiss as someone else can swipe one's name with impunity. Without one's own flow (even if only occasional) a company's Twitter persona can end up being overwhelmed by naysayers, Trolls or "swivel-eyed" boosters.

This brings us to reputational risk. In late 2017 we decided to write up developments at Bushveld Minerals. We liked the stock and the story but as they would neither answer their phone nor respond to emails we gave it a Neutral rating on what was a rather bullish writeup. The stock goes up manifold times and our research is lauded in the Twittersphere. Then come the inevitable "demands" from the Twitter enthusiasts of the stock for a follow-up coverage. This we decline as frankly Bushveld are not our clients and we have no on-going obligation to the company for anything. Hell hath no fury like a twitter-Troll scorned. They turned their attack dogs on us. Just as fast we blocked the two main offenders and then blocked a collection of Junior Trolls that felt inspired to "like" the attack upon us.

From a position of not going to write a follow-up we now have a ban on even mentioning this stock. Now Bushveld's management are in no way to blame for their Trolls but management should be blocking the Trolls from its own Twitter output and bringing these Rottweilers into line. Take away their oxygen and the Trolls will fade and die. The quality of one's Twitter feed is enhanced by not only who one follows or has following one but also who one weeds out. Bushveld have made a classic mistake of not “curating” their following with enough vigour.

Twitter (and Social Media in general) is like a garden. If you don’t like having (or moreover looking after) a garden go live in an apartment. If you don’t plant anything it will be barren and reflect badly back on the owner. “Less is More” does not work in Social Media. This is not a Japanese flower arrangement. Get it right and a miner can crash through the nonsensical new rules on accessing investors and find a whole new world of investor interaction awaiting them. What’s more it can be cheap, bordering on free. However one cannot merely flirt with the medium, one must embrace it or totally eschew it.

To paraphrase the old adage about pets.. “a Social Media presence is for life, not just for Christmas”.

Mining Model Portfolio as at: 02-Jan-19

	Security	Initiated	Currency	Price Avg.	Price Current	Portfolio Weighting	Increase in Value	Target
	Long Equities							
Various Large/Mid-Cap	Teck Resources (TECK.B)	5/29/2009	CAD	22.46	29.39	8.1%	30.9%	$38.00
	Sherritt International (S.to)	7/11/2013	CAD	1.28	0.45	3.1%	-64.8%	$1.00
	Metals X (MLX.ax)	5/29/2014	AUD	0.67	0.42	3.7%	-37.4%	$0.80
Trading House	Noble Group (CGP.SG)	15/11/2017	SGD	0.20	0.08	1.2%	-59.8%	$0.30
Uranium	Uranium Participation Corp (U.to)	10/20/2010	CAD	5.36	4.48	7.1%	-16.5%	$6.00
	GoviEx (GXU.v)	6/29/2015	CAD	0.08	0.15	3.8%	82.5%	$0.50
Zinc/Lead Plays	Zinc ETF (Zinc.L)	6/2/2010	USD	7.63	7.37	7.2%	-3.4%	$11.00
	NorZinc (NZC.to)	12/9/2011	CAD	0.82	0.08	0.2%	-90.2%	$0.22
	Myanmar Metals (MYL.ax)	11/29/2018	AUD	0.06	0.06	2.5%	0.0%	$0.13
	Ascendant Resources (ASND.v)	10/31/2016	CAD	0.49	1.00	6.1%	104.5%	$1.70
	Telson Mining (TSN.V)	3/19/2018	CAD	0.79	0.39	2.8%	-50.6%	$2.00
Silver Producer	Excellon Resources (EXN.to)	11/8/2018	CAD	0.74	0.69	2.9%	-6.8%	$1.35
	Southern Silver Exploration (SSV.v)	8/25/2016	CAD	0.49	0.20	1.1%	-58.8%	$0.35
Gold Producers	Para Resources (PBR.v)	2/17/2017	CAD	0.23	0.14	1.5%	-39.1%	$0.58
	Westgold (WGX.ax)	12/6/2016	AUD	2.01	0.90	1.8%	-55.2%	$1.50
Copper Producer	Coro Mining (COP.to)	2/23/2015	CAD	0.03	0.05	1.1%	66.7%	$0.15
Coking Coal	Colonial Coal (CAD.v)	6/4/2018	CAD	0.35	0.50	4.2%	42.9%	$1.10
Beryllium	IBC Advanced Alloys (IB.v)	4/29/2016	CAD	0.30	0.27	0.6%	-10.0%	$0.35
Driller	Cabo Drilling (CBE.v)	9/28/2016	CAD	0.03	0.02	0.8%	-20.0%	$0.02
Tungsten Producer	Almonty Industries (AII.v)	7/31/2015	CAD	0.36	0.65	6.9%	79.4%	$1.00
Copper Explorer	Asiamet Resources (ARS.v)	4/28/2016	CAD	0.05	0.04	1.3%	-18.4%	$0.12
	Phoenix Global Mining (PGM.L)	9/28/2018	GBP	0.35	0.24	2.1%	-30.6%	$0.74
	Panoro Minerals (PML.v)	1/22/2018	CAD	0.37	0.24	1.5%	-34.2%	$0.65
	Argonaut Resources (ARE.ax)	11/22/2018	AUD	0.02	0.02	2.0%	11.1%	$0.45
	Western Copper & Gold (WRN.to)	4/25/2017	CAD	1.57	0.62	1.3%	-60.5%	$2.74
Vanadium Developer	Tando Resources (TNO.ax)	11/23/2018	AUD	0.11	0.08	2.1%	-27.3%	$0.50
Lithium	Neometals (NMT.ax)	7/31/2014	AUD	0.30	0.24	4.6%	-20.8%	$0.45
	Lithium Power Intl (LPI.ax)	10/25/2017	AUD	0.44	0.26	1.6%	-40.9%	$1.38
Manganese Developer	EuroManganese (EMN.ax/EMN.v)	11/9/2018	AUD	0.20	0.24	3.4%	20.0%	$0.60
Scandium Explorer	Scandium International (SCY.to)	8/23/2016	CAD	0.14	0.21	2.7%	50.0%	$0.50
	Platina Resources (PGM.ax)	10/25/2018	AUD	0.07	0.06	2.4%	-7.7%	$0.18
Gold Explorer	Banyan Gold (BYN.v)	11/14/2017	CAD	0.06	0.05	2.4%	-19.4%	$0.15
	Gunpoint Exploration (GUN.v)	11/9/2018	CAD	0.50	0.41	1.7%	-17.2%	$0.15
Graphite Developer	Talga Resources (TLG.ax)	8/25/2016	AUD	0.27	0.40	2.0%	50.9%	$0.90
Rare Earths	Northern Minerals (NTU.ax)	6/9/2011	AUD	0.14	0.06	2.0%	-57.5%	$0.28
	Neomaterials (NEO.to)	10/25/2018	CAD	17.32	15.40	4.9%	-11.1%	$23.00
	NET CASH					**202,602**		
	Short Equities							
						Weighting		
Shorts	NioCorp (NIO.to)	9/28/2018	CAD	0.61	0.61	62.4%	0.0%	$0.40
	Lithium Americas (LAC.to)	10/25/2017	CAD	10.10	4.31	17.9%	57.3%	$5.00
	Galane Gold (GG.v)	4/28/2016	CAD	0.06	0.06	19.6%	0.0%	$0.03

Current Cash Position	**202,602**
Current Liability on Shorts Not Covered	**247,327**
Net Cash	**449,929**
Current Value of Bonds	**0**
Current Value of Long Equities	**3,473,908**
TOTAL VALUE OF PORTFOLIO	**3,923,837**

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