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Chart comments as at Friday's close

Analyst : Warwick Grigor

## Antimony - the most important mineral you have (probably) never heard of

The new financial year has seen an abatement of selling in many stocks, with the result that they have started to lift from their lows. While this is encouraging, the sentiment is still fragile. We did see a midweek slump in oil and iron ore prices that drove the Metals and mining Index dramatically lower, but these indices have rallied somewhat.

The bear market in equities is catching up with metal prices with gold taking a dive below US\$1,750/oz and copper being 30% off its high. The US\$ hitting a two year high has obviously been a factor in the weaker metal prices.

### Victorian Goldfields Visit

I thought that there was no point in sitting looking at a red screen in the last week June, so I went to the Victorian goldfields to get a better handle on what was happening down there. Victoria has been traditionally seen as a very difficult jurisdiction due to environmental and permitting issues, especially if you have a WA mindset. One of the explanations could be that the goldfields are often within a couple of hours drive from Melbourne and proximate to the the country houses of many Melbourne residents. NIMBYism is an unavoidable factor.

Permitting still not easy, so that if a company has a granted mining licence and pre-existing tailings dam facilities, it has a strategic advantage. A very interesting company that we saw, Nagambie Resources Ltd (NAG), has both.

There have been strong advancements in the geological understanding in recent years emanating from the Fosterville and Costerfield mines. Both these mines were hard work to begin with due to the sulphuric nature of the ore. You could use the word refractory, but that brings out bogeymen that could cloud one's mind to the potential. The association of these orebodies with stibnite is now being understood with much greater clarity and in fact, finding stibnite in quartz/gold related systems now serves as an inspiration.

As has been shown at Fosterville mine, recently taken over by Agnico Eagle, geology can pass out of the stibnite sequences and into spectacularly rich free gold deposits. Mandalay Resources is going through a similar transition in mine geology, though we don't yet know if it will be as rewarding as Fosterville.

### Antimony is a critical metal

As a prelude to comments on the individual companies with gold and stibnite down in Victoria, this week I will provide you some insight as to why antimony matters. As Southern Cross Gold said in a recent presentation, antimony is the most important metal you have never heard of.

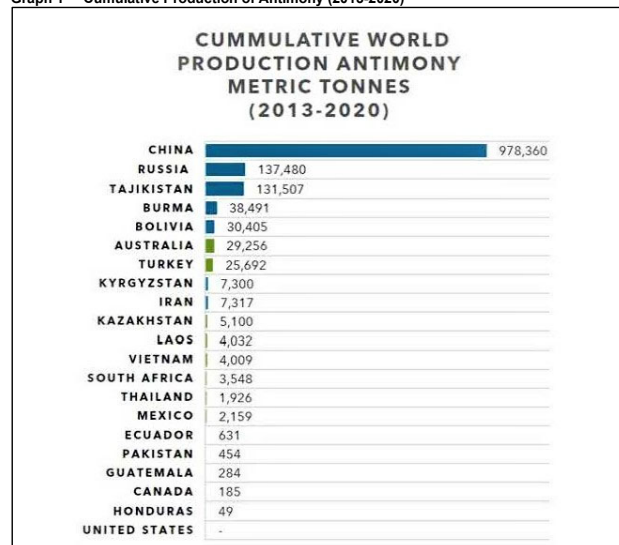
### Supply is critically tight

Russia and China between them account for 82% of antimony supply. Tajikistan and Burma are the next two largest suppliers. Of the top ten countries, only Australia can be considered low geopolitical risk.

### The rising price reflects the scarcity

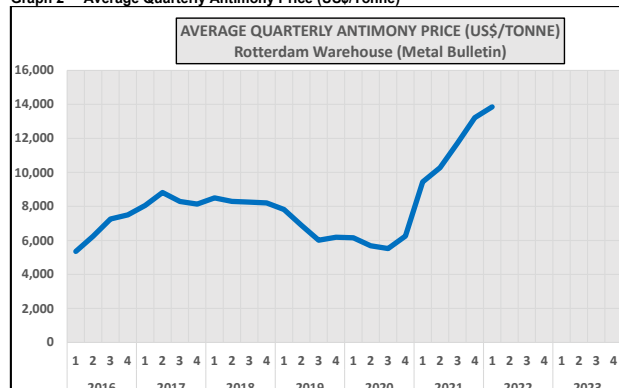
The last time I had a serious look at antimony, in the New England region of NSW, the price was less than US\$2,000 pt. The chart below shows it was trending between US\$6,000 and US\$10,000 pt from 2016 to 2021, but over the last 18 months it has risen to about US\$14,000 pt. Rather than being of nuisance value as a gold by-product, it is now a high value co-product. The gold equivalent grades being reported by the Victorian explorers are looking very exciting, with estimated mining widths well in excess for 20 gpt for narrow underground mines.

Graph 1 Cumulative Production of Antimony (2013-2020)



From a Southern Cross Gold (ASX: SXG) presentation.

Graph 2 Average Quarterly Antimony Price (US\$/Tonne)



### Uses of antimony

Antimony alloys with lead and tin which results in improved properties for solders, ammunition (bullets, artillery shells, rockets, missiles), bearings and batteries. Antimony is a prominent additive for halogen-containing flame retardants. Adequate supplies of antimony are critical to the world's energy transition and to the high-tech industry, especially the semi-conductor and defence sectors. Antimony is a critical element in the manufacture of lithium-ion batteries and to the next generation of liquid metal batteries that are predicted to lead to scalable energy storage for large wind and solar renewable power projects

### Antimony for battery anodes

In searching for better anode materials than graphite, which has a theoretical capacity of 372 mAh/g, antimony anodes have demonstrated a capacity of 660 mAh/g with a volume expansion of only 135%, compared to silicon at 400%. Thus there is much interest in antimony for batteries. Antimony also seems to be safer than graphite as it experiences less dendrite creation, meaning a lower risk of thermal runaway. As with other alternative anode materials, further work is required to achieve cycle stability before becoming commercialised.

### Calcium-antimony-liquid metal for batteries

In 2021, a company called Ambri Inc secured US\$144m to commercialise calcium-antimony-liquid metal battery chemistry. Paulsons and Co, a company associated with Bill Gates, was part of the funding consortium.

The liquid metal battery is comprised of a liquid calcium alloy anode, a molten salt electrolyte, and a cathode comprised of solid particles of antimony, enabling the use of low-cost materials and a low number of steps in the cell assembly process.

The active materials in its cells reversibly alloy and de-alloy while charging and discharging. The electrolyte is thermodynamically stable with the electrodes, avoiding side reactions such as film-formation that can lead to performance degradation. The negative electrode is fully consumed when discharged, and reformed on every cycle, resulting in what the company said is a "highly repeatable process with no memory effect."

Ambri's chemistry is being developed to meet the demands of large industrial energy customers, such as data centres. Late last year, Ambri agreed with TerraScale, a clean infrastructure design and development firm, to deliver 250

MWh of Ambri systems to TerraScale's Energos Reno data center project. The site's battery will be bolstered by a reported 500 MW of on-site renewable generation.

Ambri said that following the funding round it now is able to scale for projects from 10 MWh to over 2 GWh around the globe, with durations ranging from 4 to 24 hours.

### "China exports deflation" is a stange headline.

I found the article by Robert Gottliebson's commentary on page 20 of The Australian last Wednesday to be rather confusing when he said "China is about to export deflation to the USA via its access to cheap Russian oil and gas, plus Mongolian coal." I would have thought that this would be useful in the fight against inflation. It is certainly better than China exporting inflation.

He seems to be suggesting that there is a conspiracy underway between Russia and China, to undermine US manufacturing. Would Russia really prefer to get a lower price for its oil and gas, or is it just selling it cheaply because of the sanctions? If there is any reality to the conspiracy, does it fall apart after the Ukraine War.

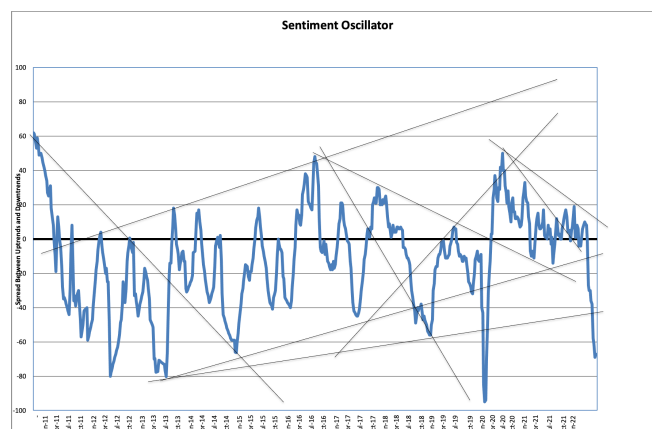
The story becomes even more circumspect when Gottliebson expresses his gratitude to MacroBusiness and Malcolm Turnbull's son, for alerting him to purported strategy. He quotes Alex Turnbull, saying that "Australian metal processing is about to be wiped off the face of the earth as it is supplanted by Chinese output". It is a rather dramatic, attention seeking opinion to be sprouting. I can only wonder what the agenda is, hidden or otherwise, as it seems a bit fanciful.

### Los Cerros has good news on metallurgy

Last week we gave the political climate in Colombia as one of the reasons for a weak share price performance, but this week there has been some good news to help out. Metallurgical test work has shown that the Tesorito ore responds well to a simple process flow sheet with a standard 75µm crush, cyanide leach and absorption circuit. Interestingly, the market capitalisation only \$21m and the cash balance is \$14m. The shares are selling at fire sale prices.

*Disclosure: Interests associated with the author own shares in Los Cerros.*

We have added Nagambie Resource to the chart coverage.



**Sentiment Oscillator:** Sentiment improve marginally. There were 9% (11%) of the charts in uptrend and 76% (80%) in downtrend on Friday's close.

## Detailed Chart Comments

*NB. Only the bold comments have been updated. Comments in grey type are from previous weeks and will be less relevant. Please note that this list is a cross section of the market. It IS NOT a list of recommendations.*

Indices	Code	Trend Comment	
All Ordinaries	XAO	recovering from lows	
Metals and Mining	XMM	recovering from lows	
Energy	XEJ	testing support line	
Information Technology	XIJ	still falling	
Stocks	Code	Trend Comment (updated comments in bold)	Main Interest
A-Cap Energy	ACB	new low	uranium
Alpha HPA	A4N	downtrend	HPA
Adriatic Resources	ADT	new low	zinc, polymetallic
Advance Metals (was Pacific American)	AVM	down	coal, gold exploration
Alkane Resources	ALK	new low	gold
Alicanto Minerals	AQI	testing downtrend	base metals, silver, gold
Altech Chemical	ATC	new low	HPA, anodes
Anteotech	ADO	new low	silicon anodes, biotech
Alto Metals	AME	testing uptrend	gold exploration
American Rare Earths	ARR	new low	rare earths
Antilles Gold	AAU	still down	gold
Arafura Resources	ARU	heavy fall	rare earths
Ardea Resources	ARL	new low	nickel
Aurelia Metals	AMI	new low	gold + base metals
Australian Potash	APC	new low	potash
Australian Rare Earths	AR3	new low	rare earths
Auteco Minerals	AUT	new low	gold exploration
Arizona Lithium	AZL	new low	lithium
Azure Minerals	AZS	new low	nickel exploration
BHP	BHP	new low	diversified, iron ore
Beach Energy	BPT	new uptrend confirmed	oil and gas
Bellevue Gold	BGL	new low	gold exploration
Benz Mining	BNZ	new low	gold
Blue Star Helium	BNL	new low	gas, helium
BMG Resources	BMG	down	gold exploration
Boab Metals	BML	new low	silver/lead
Breaker Resources	BRB	breached support	gold exploration
Buru Energy	BRU	new low	oil
Calidus Resources	CAI	new low	gold
Capricorn Metals	CMM	breached support line	gold

Caravel Minerals	CVV		new low	copper
Castile Resources	CST		still sideways	gold/copper/cobalt
Celsius Resources	CLA		new low	copper
Chalice Mining	CHN		down	nickel, copper, PGMs, gold exploration
Chesser Resources	CHZ		new low	gold exploration
Cobalt Blue	COB		new low	cobalt
Cyprium Metals	CYM		new low	copper
De Grey	DEG		new low	gold
E2 Metals	E2M		new low	gold exploration
Ecograf	EGR		new low	graphite
Element 25	E25		new low	manganese
Emerald Resources	EMR		holding support	gold
Empire Energy	EEG		new low	gas
Euro Manganese	EMN		new low	manganese
Evolution Mining	EVN		collapse	gold
Firefinch	FFX		new low	gold
First Graphene	FGR		testing downtrend	graphene
Fortescue Metals	FMG		new low	iron ore
FYI Resources	FYI		testing downtrend	HPA
Galena Mining	G1A		new low	lead
Galilee Energy	GLL		testing trendline	oil and gas, CBM
Genesis Minerals	GMD		down	gold
Genmin	GEN		sideways	iron ore
Gold Road	GOR		down	gold
Great Boulder Resources	GBR		new low	gold exploration
Hastings Technology Metals	HAS		breached support line	rare earths
Hazer Group	HZR		strong rally	hydrogen
Heavy Minerals	HVY		breached support line	garnet
Highfield Resources	HFR		testing downtrend	potash
Hillgrove Resources	HGO		breaching uptrend	copper
Iluka Resources	ILU		back in downtrend	mineral sands
Image Resources	IMA		new uptrend breached	mineral sands
ioneer (was Global Geoscience)	INR		testing downtrend	lithium
Ionic Rare Earths	IXR		testing downtrend	rare earths
Jervois Mining	JVR		new low	nickel/cobalt
Kingston Resources	KSN		new low	gold
Krakatoa Resources	KTA		new low	rare earths
Kingfisher Mining	KFM		on support line	rare earths
Kingwest Resources	KWR		new low	gold
Legend Mining	LEG		new low	nickel exploration
Lepidico	LPD		breached uptrend	lithium
Lindian Resources	LIN		new high	bauxite
Lion One Metals	LLO		pullback	gold
Los Cerros	LCL		new low	gold exploration

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Lotus Resources	LOT		down	uranium
Lucapa Diamond	LOM		new low	diamonds
Lynas Corp.	LYC		breached support line	rare earths
Magnetic Resources	MAU		new low	gold exploration
Mako Gold	MKG		new low	gold exploration
Marmota	MEU		holding short term uptrend	gold exploration
Marvel Gold	MVL		new low	gold exploration
Matador Mining	MZZ		new low	gold exploration
Mayur Resources	MRL		new low	renewables, cement
Meeka Gold	MEK		but pullback	gold
Megado Gold	MEG		back to downtrend	rare earths, gold exploration
MetalsX	MLX		new low	tin, nickel
Metro Mining	MMI		testing downtrend	bauxite
Mincor Resources	MCR		new low	gold/nickel
Mithril Resources	MTH		down	gold/silver
Musgrave Minerals	MGV		testing downtrend	gold exploration
Nagambie Resources	NAG		sideways	gold, antimony
Neometals	NMT		testing downtrend	lithium
Northern Star Res.	NST		new low	gold
Nova Minerals	NVA		new low	gold exploration
Oceana Gold	OGC		down	gold
Oklo Resources	OKU		spiked through downtrend	gold expl.
OreCorp	ORR		new low	gold development
Oz Minerals	OZL		new low	copper
Pantoro	PNR		new low	gold
Panoramic Res	PAN		down	nickel
Peak Minerals	PUA		new low	copper exploration
Peak Resources	PEK		new low	rare earths
Peel Mining	PEX		new low	copper
Peninsula Energy	PEN		new low	uranium
Poseidon Nickel	POS		new low	nickel
Perseus Mining	PRU		softer	gold
Provaris Energy	PV1		testing downtrend	hydrogen
PVW Resources	PVW		testing downtrend	rare earths
QMines	QML		new low	copper
Queensland Pacific Metals	QPM		new low	nickel/cobalt/HPA
Red River Resources	RVR		still down	zinc
Regis Resources	RRL		new low	gold
Renegen	RLT		testing downtrend	gas, helium
Resource Mining Corp.	RMI		pullback on placement	nickel exploration
RIO	RIO		new low	diversified, iron ore
Rumble Resources	RTR		good rally	gold exploration
S2 Resources	S2R		down	gold exploration
St Barbara	SBM		new low	gold

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Sandfire Resources	SFR		new low	copper
Santos	STO		uptrend	oil/gas
Saturn Metals	STN		sideways	gold exploration
Silex Systems	SLX		new high	uranium enrichment technology
Silver Mines	SVL		down	silver
South Harz Potash	SHP		down	potash
Southern Cross Gold	SXG		ST down	gold exploration
Stanmore Coal	SMR		pullback	coal
Strandline Resources	STA		just holding support line	mineral sands
Sunstone Metals	STM		downtrend	exploration
Talga Resources	TLG		new low	graphite
Technology Metals	TMT		down	vanadium
Tesoro Resources	TSO		new low	gold exploration
Theta Gold Mines	TGM		down	gold
Thor Mining	THR		down	gold exploration
Tietto Minerals	TIE		new low	gold
Titan Minerals	TTM		down	gold
Turaco Gold	TCG		downtrend	gold exploration
Vanadium Resources	VR8		breached uptrend	vanadium
West African Resources	WAF		testing uptrend	gold
Westgold Resources	WGX		down	gold
West Wits Mining	WWI		new low	gold
Whitehaven Coal	WHC		secondary uptrend	coal
Wiluna Mining	WMC		new low	gold
Yandal Resources	YRL		new low	gold exploration
Zenith Minerals	ZNC		new low	gold exploration
Zinc Mines of Ireland	ZMI		new low	zinc
Totals	9%	13	Uptrend	
	76%	109	Downtrend	
		143	Total	

### Guides to Chart Interpretations

- Charts usually go pass from one trend (up or down) into the other via a period of indecision and uncertainty during which the trend can either recover or change. This period is signified by the orange colour. The orange represent both the greatest risk and greatest reward possibilities.
- Once a chart is in confirmed up or downtrends it is not uncommon for 10-20% of that trend to have already transpired.
- There are trends within trends. The focus of this chart review is the immediate trend that affects the sentiment i.e. it can be a downtrend within a long-term uptrend.
- Not every chart warrants a new comment every week. The new comments are in bold type. Grey type comments may be dated.
- Individual charts provide a single view. It is valuable to look at charts of other companies in similar commodities, and the overall sentiment is also very valuable. Not many stocks can swim against the tide.
- We periodically add or delete charts, some times for obscure reasons. If a chart consistent gives poor signals or is very erratic, we may delete it. Sometimes we add a chart because we want to see what all the fuss is about. We do have a preference for charting stocks that we cover in our research as well.
- Errors and omissions may occur from time to time, especially in fast moving markets.

Amber Lights in Tables: Just a reminder if when the amber light is used in the table – it is when the charts are ambiguous or when there is a change of trend taking place. If a chart is breaching a downtrend it can either be a positive sign or a trap. Only once it has done more work can it be confirmed as a new uptrend. Maybe it is a new uptrend (or conversely a new downtrend); the risk takers can decide to jump on board early (or sell). They will maximise their profits (or

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minimise their losses if indeed it is the start of the new uptrend (downtrend). More risk-averse investors should wait a little longer, being prepared to give up some of the gains in return for greater certainty.

Weightings of Sectors Represented in the Company Charts			
Sector	No. of Companies	Weighting	
Gold	32	22.4%	
Gold Exploration	23	16.1%	
Rare Earths	11	7.7%	
Nickel	10	7.0%	
Copper	10	7.0%	
Oil/Gas	8	5.6%	
Iron Ore/Manganese	6	4.2%	
Zinc/Lead	5	3.5%	
Lithium	4	2.8%	
Uranium	4	2.8%	
Graphite/graphene	3	2.1%	
Potash/Phosphate	3	2.1%	
Coal	3	2.1%	
Mineral Sands	3	2.1%	
Silver	2	1.4%	
Bauxite	2	1.4%	
Vanadium	2	1.4%	
Cobalt	1	0.7%	
Tin	1	0.7%	
Diamonds	1	0.7%	
Other	9		
Total	143		

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