

## Features and Interviews

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# Antimony: A Metal?

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### “Antimony Speculators Lose Out”

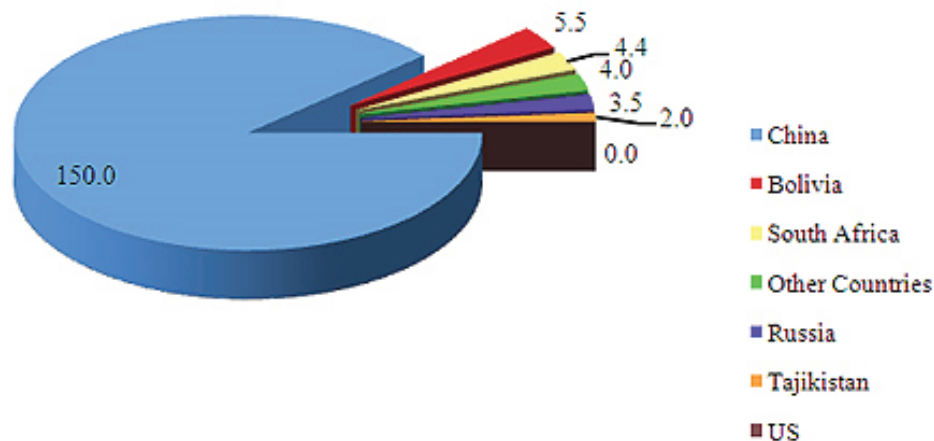
*Speculators who tied up large sums of money in Chinese antimony, which is used in the making of ammunition, in the hopes of reaping great profits are now ruining their greediness...*

—New York Times

So reported a recent story in the *New York Times*.

Well, that’s recent in relation to the history of antimony. In absolute terms, however, the story was actually published some 92 years ago, on November 25, 1917. Interestingly, antimony is still used in ammunition, and China remains the metal’s primary source.

*Estimated World Mine Production of Antimony in 2008 (Thousand Tonne)*



Source: [U.S. Geological Survey](http://www.usgs.gov) (USGS)

### A Very Brief History of Antimony

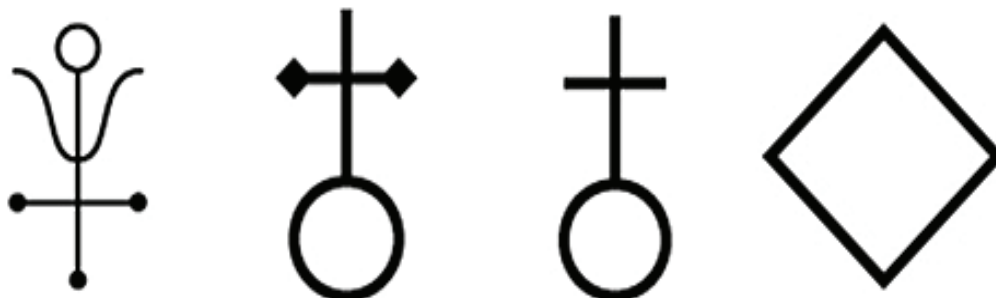
Pure antimony metal is silver gray/white and brittle.

Although actually a metal, like germanium and tellurium (of which more in forthcoming articles), antimony

is also termed a metalloid. (A metalloid displays the characteristics of both a metal and a nonmetal.) In addition, it has four allotropes (see [Gallium: A Slippery Metal](#)), of which two (yellow antimony and black antimony) are neither stable nor metallic. Indeed, yellow antimony, which only occurs at temperatures below  $-80^{\circ}\text{C}$ , is extremely explosive.

Antimony has been known of, and used, from at least the third millennium BCE. Back then it was used, amongst other things, in eye shadow (kohl) and for medicinal purposes. (More recently it has been used in the treatment of bilharzia (schistosomiasis), a particularly nasty disease caused by parasitic worms that can spread throughout most of your body.) Antimony and its compounds can, however, be particularly toxic.

From the Middle Ages on, antimony has also featured strongly in alchemy and, indeed, the metal has a number of symbols of its own.



These days, antimony is used for a number of other, different, uses.

Its main use is as a flame retardant. When impregnated with compounds formed from antimony trioxide ( $\text{Sb}_2\text{O}_3$ ), plastics, rubber and textiles all become, to a degree, fireproof.

According to the USGS, in 2008, some 40% of the antimony consumed in the U.S. was used in fire retardants. The remainder was accounted for thusly: transportation, including batteries, 22%; chemicals, 14%; ceramics and glass, 11%; and, others, 13%.

Apart from its use in lead-acid batteries, when mixed with lead, the resulting alloy is considerably stronger than either of the two original metals. (It is also mixed with zinc to make other alloys.)

These alloys are to be found in such diverse uses as pipe and sheet metal, solder, cable coverings, pewter, castings and bearings (in particular as Babbitt metal), tank linings and, of course, ammunition.

While, in the glass industry, antimony is used to remove the bubbles from, refine and de-color various different types of glass, in ceramic and porcelain glazes it is actually used as an opacifier. (It can also be used to provide yellow coloring.)

In addition to being used as a catalyst in the polyester industry, in chemical form antimony is used in fireworks (antimony trisulfide produces glittering white stars) and can be found, once again, in ammunition, used as a primer - it promotes ignition. (Antimony has, in the past, also been used in the solid propellants that power rockets, for example, as a [stabilizer for burning-rate modifiers](#) in the fuel itself.)

Finally, because of its metalloid nature, research continues into further uses of antimony in semiconductors: It is already used as a dopant.

### **Whence The Antimony?**

As with other of the so-called minor metals, most of the world's antimony comes from China; it has for nearly a hundred years. (It is interesting to note, though, that the run-up in the price of the metal those 90 or so years ago stimulated production elsewhere around the globe. One of those places was Bolivia, which remains a major antimony producer.)

In China, one of the largest, if not the largest, antimony mining company is the charmingly named Hsikwangshan Twinkling Star Company in Hunan Province, which owns two major antimony mines. In its February 2008 [newsletter](#), Metal Pages reported that this company alone had the capacity to produce some 1,000 tonnes per month of antimony metal.

While found in over 100 different mineral forms, stibnite (Sb<sub>2</sub>S<sub>3</sub>), an antimony-bearing ore, is the only source for metallic antimony to be commercially mined. Since antimony is often to be found as a trace element in gold, copper, lead and silver ores, the metal is also extracted from these.

In 2008, according to the USGS, there was a sole mine in Nevada, operated by Stockpile Reserves Inc., that produced antimony concentrate. During the year, however, the OTC-traded [United State Antimony Corporation](#) (USAC) (**Bloomberg Ticker - UAMY:US**) produced both antimony metal and oxides at its manufacturing facility in Thompson Falls, Montana, using both old tailings and feedstock from mines in Mexico and Central America. In the company's own words, unlike other antimony-producing companies in the U.S.: "USAC is not dependent on Chinese feed."

Other states in the U.S. with resources of antimony, apart from Montana and Nevada, include Alaska and Idaho, with the possibility of further resources in "[Mississippi Valley-type lead deposits in the Eastern United States.](#)"

At its Workman's Bench antimony/gold deposit located at Nolan Creek in Northern Alaska, [Silverado Gold Mines Ltd](#) (**Bloomberg Ticker - SLGLF:US**), another OTC-traded mining company, recently [reported](#) resource and reserve estimates for the antimony there that showed, using the company's assumptions, the metal "would clearly drive the project..."

Slightly closer at hand, across the U.S. border at Gander in central Newfoundland, Canada, a couple of companies, [VVC Exploration Inc](#) (**Bloomberg Ticker - VVC:CN**), and [Wogen plc](#) (**Bloomberg Ticker - WGN:LN**), have taken stakes in Beaver Brook Antimony Inc.

According to a [news release](#) from VVC on CNW wires in February 2008: "The Beaver Brook Mine, located in central Newfoundland approximately 60 kilometres southwest of Gander, is the only operating antimony mine in North America and is also one of the world's largest undeveloped antimony deposits outside of China and South Africa.

Once in full production, the Mine could supply nearly up to 5% of world's annual demand and its neighbouring country, the United States is one of the world's largest consumer of antimony."

In South Africa, the largest antimony producer is Consolidated Murchison, a subsidiary of the South African concern [Metorex Limited](#) (**Bloomberg Ticker - MTX:SJ**). Consolidated Murchison's resource, situated at Gravelotte in South Africa's Limpopo Province, is, according to the company, "the single largest antimony orebody known in the world, having produced in excess of nine million tons of high-grade stibnite ore."

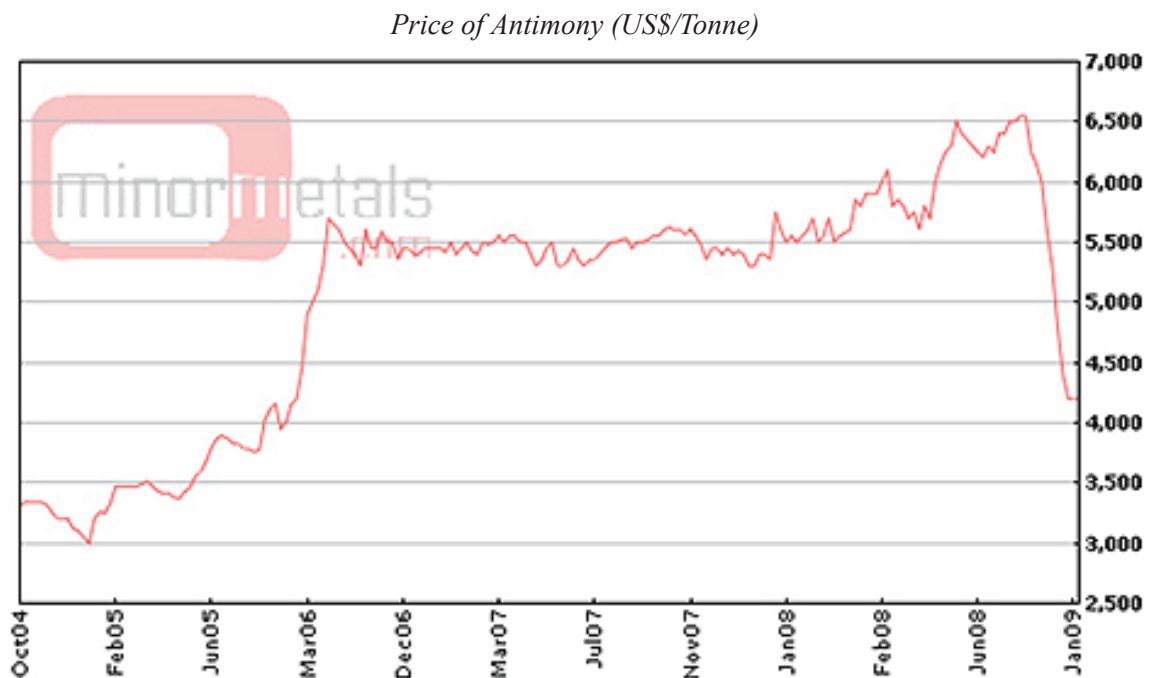
Elsewhere around the world, [Cambrian Mining Ltd](#) (**Bloomberg Ticker - CBM:LN**) continued to mine antimony at both its Costerfield (having purchased AGD Mining Ltd) and Augusta sites in Victoria, Australia. According to its latest [annual report](#), published in November 2008, "All gold and antimony concentrates produced were sold under contract to the Hunan Zhongnan Tungsten and Trading Company, an antimony smelting company in China."

Several other mining companies in Australia, for example [Northwest Resources Ltd](#) (**Bloomberg Ticker - NWR:AU**), [Straits Resources Ltd](#) (**Bloomberg Ticker - SRL:AU**) and [Republic Gold Limited](#) (**Bloomberg Ticker - RAU:AU**), have antimony ore extraction operations, but they are all associated with these companies' main business of gold mining.

After Australia, the next largest antimony-producing country is Turkey, whose antimony industry is dominated by Özdemir Antimony Mining Joint-Stock Company with its mining operations in the Turhal district of Tokat Province, northern Turkey. The company is, however, not quoted on the Istanbul Stock Exchange.

## Opportunities in Antimony

Currently, the price of antimony metal is low. In fact, it is now at levels not seen since early 2006.



Source: [minormetals.com](http://minormetals.com)

In the present economic environment, and with the fact that, in the U.S. anyway, some 40% of antimony use is in fire retardants in such consumer goods as bedding, clothes and furniture, it is difficult to imagine demand increasing anytime soon. Any growth in its use in the field of lead-acid batteries, too, appears unlikely.

While consumption of the metal in ammunition looks set to continue, this is unlikely to help take up any real supply slack.

With this in mind, for some of the exploration companies, and the smaller mining concerns for whom antimony is an important factor in their revenue equations, conditions look to remain tough for a while. Even for those “pure plays” with established antimony operations, life certainly may not be easy for a while yet.

For those for whom antimony is an “added extra” from their mining operations for other metals - for example, gold - the impact from the metal’s price today may not be so serious.

On the whole, therefore, what with current prices for the metal, and the fact that, in many of its uses, particularly in flame retardants, antimony does have its accepted substitutes, there seem not to be that many interesting, and obvious, opportunities for investing in antimony.

That said, however, it may be worth keeping an eye on at least two current uses of antimony. First, its use by the military: In 2006 alone, the country’s new import reliance on the metal was 88%. Over the past couple of years this dependence will not have changed significantly. This is an important material for the military. Second, its use in semiconductors: There may be further developments in this area.

## Resources

[U.S. Geological Survey \(USGS\)](#)

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