

# FINAL VERDICT

**A ban on the import or use of mercury in manufacturing goes into effect in Canada next year. Mercury mounts a defence in the court of scientific inquiry.**

By Tyler Irving

**T**he prisoner stood, head bowed, in the witness box, as the judge read the verdict. “Mercury, alias Quicksilver, alias Hydrargyrum, as a known neurotoxin, you are convicted of posing a danger to humanity,” the judge declared. “I sentence you to be banned in all practical forms from the manufacture, import and sale of all products in Canada, beginning in 2012.

“Do you have any final words?” the judge asked, peering over his spectacles at the thin, silver-haired defendant.

The prisoner raised his head to meet the judge’s gaze. “Thank you, your honour. I know that nothing I can say will change the decision of the court, however, I appreciate the opportunity to defend my name. The charges against me are based on a biased misreading of the facts. The many benefits that I have brought to humanity over the past millennia have been ignored. I reiterate my defence that I have aided humanity more than I have harmed it.”

Mercury cleared his throat and turned his gaze to the packed courtroom: “I was born in humble circumstances, in

a block of cinnabar, thousands of years ago. For most of my life I was a simple pigment, adorning buildings, pottery and occasionally human bodies with a characteristic red hue. But it was in the ovens of the ancient alchemists that I was liberated by heat, assuming my familiar, dazzling form: shiny like metal, flowing like liquid and able to combine with a seemingly infinite variety of other metals in amalgams. I became known as *Prima Materia*, the ideal form of metal. Along with sulphur and salt, I was considered one of the fundamental materials of the universe. Some considered me a bridge between the known and the unknown, transcending solid and liquid, earth and heaven, life and death.”

Mercury paused and scanned the riveted crush of onlookers. “But anyone who took the alchemists seriously did so at their peril. The Chinese emperor Qin Shi Huang was one. In the months leading up to his death in 210 B.C.E., he ingested great quantities of mercury-containing pills, which his doctors believed would make him immortal. The emperor is believed to have died of mercury poisoning. However, I respectfully

submit that it is the physicians' malpractice, not I, that is responsible for Qin Shi Huang's demise.

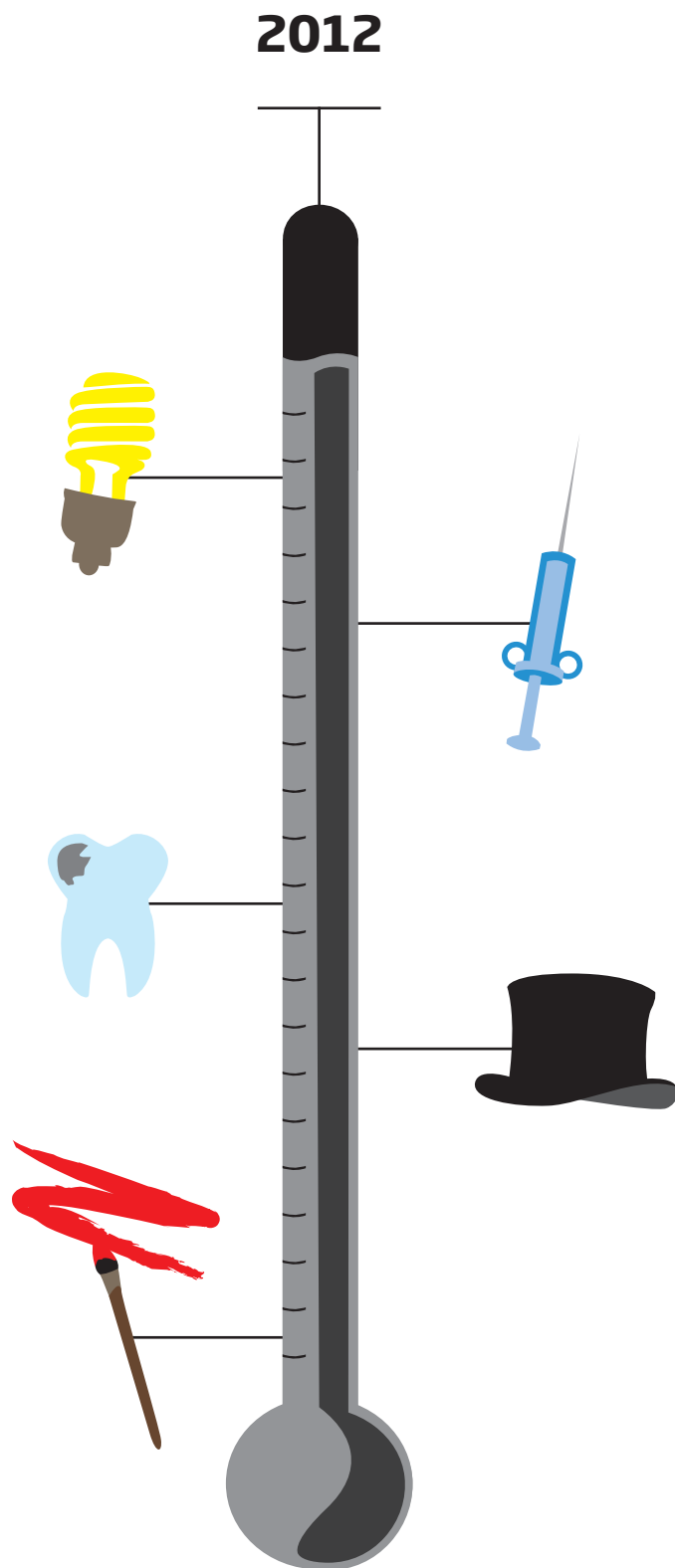
"Around the same time," Mercury continued, "I became involved in the mining industry. My knack for combining easily with gold allowed me to absorb small particles of this metal from the ore — particles too small to be panned. As part of my amalgam, however, they easily sunk to the bottom of the miner's pans and we could be separated once more. If it weren't for this, huge quantities of gold would remain unrecovered to this day."


Mercury paused to take a deep breath, then resumed his oration. "Through mining, I gained an appreciation for the finer things in life. One of my crowning achievements was in the European and British haberdasheries of the 17<sup>th</sup> to 19<sup>th</sup> centuries. In my orange nitrate salt form, I broke down the stiff outer hairs of beaver pelts, allowing them to be more easily matted together into the felt hats that fine gentlemen wore. Of course, some of the hat makers failed to take precautions and inhaled the mercury vapours, leading to sensory impairment, numbness, loss of vision, shaking, clumsiness and anti-social behaviour. I assert once again that I cannot be blamed for these effects.

"If there is a villain here, it is the unlearned medical practices of the times. Before the 20<sup>th</sup> century, doctors believed I could cure the sick and extend life. I was prescribed for many ailments, from teething pain to syphilis. Recall the poetic but bitter aphorism: 'a night with Venus is followed by a lifetime with Mercury.'

"Pure white calomel, my chloride, is one of my more attractive salts and is supremely useful for measuring electric potentials, as scientists would later discover. But 200 years ago, the best use that scientific minds could conceive of for calomel was as a laxative. Benjamin Rush, a signer of the United States Declaration of Independence, is doubtless responsible for the deaths of hundreds of patients with yellow fever, to whom he fed calomel until they foamed at the mouth and their teeth fell out. His laxatives, called 'Thunderclappers,' were used by members of the Lewis and Clark expedition on their famous trek from Illinois to the Pacific Coast. To this day, the 19<sup>th</sup>-century excursion can be traced by deposits of mercury in the soil.

"Yet, I have much to contribute to human health," Mercury continued. "In my liquid elemental form, I'm practically





harmless, for I am hardly absorbed by the digestive tract at all. In this form, I can do plenty of good, most notably in dental fillings. For more than 100 years, I have repaired the broken teeth of humankind, and many people still carry me in their mouths. Without my help, they would still be suffering from pain, infection and nutritional problems.

“I am a boon to medicine in other ways. Mercury thermometers made it possible to measure miniscule rises in temperature while mercury sphygmomanometers allowed blood pressure measurements. Without these tools, health care would still be in the dark ages. For more than a century, my bright orange-coloured organic salt merbromin — known as Mercurochrome, Asceptichrome or Supercrome — kept wounds clean from bacterial infections. Another of my organic forms, Thimersol, also fights bacteria, keeping vaccines, medicines and cosmetics from spoiling.”

Mercury directed his comments to the judge. “You’ll find my handiwork in places where you least expect it. The very paper you are reading from was prepared and bleached with chemicals that for decades were produced using the Castner-Kellner process. This system employs a mercury-based electrolytic cell to break apart salt water into sodium hydroxide and chlorine gas, both of which are useful in the pulp and paper industry. And my salts can be used as catalysts in the production of acetaldehyde, a fantastically useful chemical used in the manufacture of perfumes, plastics, synthetic rubber, drugs, and explosives.

“Regretfully, my work in these important areas has been curtailed due to my negative reputation. It’s true that residues from industrial processes — if improperly designed — can leak into water sources. Here, microorganisms change me into methylated organic forms that, unlike my native metal, are easy for organisms to absorb. I am thus consumed by plankton, which are eaten by shellfish. I accumulate and concentrate as I move up the food chain into seals, whales and humans. This is the cause of Minamata disease, first noted near an industrial plant in Japan almost 60 years ago. The symptoms are similar to the mad hatters of past centuries: numbness in the hands and feet, trouble balancing, difficulties seeing,

hearing, swallowing and even death. Some of the same symptoms appeared among aboriginal Canadians living near paper mills in Northern Ontario in the 1970s. Even today, northern peoples who consume whale and seal meat have elevated levels of mercury in their hair, blood and breast milk.

“But such things are the result of human shortcomings: poor regulations, inadequate waste management and ill-conceived plant designs. Because of them, I have been usurped by other molecules in antiseptics, by polymer composites in dental fillings and by electronic devices in blood pressure machines. My work in industry has been taken over by nickel and titanium and alcohol now fills thermometers.

“But I contend that I am no more a threat to humanity than any of my metallic brethren and still have an important role to play. I light up cities all over the world as a component of compact fluorescent light bulbs, the one application for which no substitute has yet been found. The energy saved by these bulbs cuts down on the use of coal-fired power plants, the same plants from which my vapours can’t help but be expelled into the air by the scalding temperatures in the furnaces. I will continue to have a place in laboratories, where my unique abilities have always been appreciated. And I hold out hope that the chemists of the future will find new uses for my talents that will enable me to take my rightful place once again.”

Mercury paused. “Your honour, I am finished now. Thank you for allowing me to restate and elucidate my defence, although I realize that it has no impact upon the decision of this court.”

The judge looked down at the defendant in the dock. “Mercury, your contributions to the intellectual progress and betterment of humankind are indisputable. However, the evidence: that you have poisoned the environment and been responsible for countless cases of disease, suffering and death are equally indisputable. In the opinion of this court, your usefulness is outweighed by your disadvantages and for this you are banned. Your life sentence commences in 2012.”

The judge picked up the gavel and brought it down. “Court is dismissed.” 