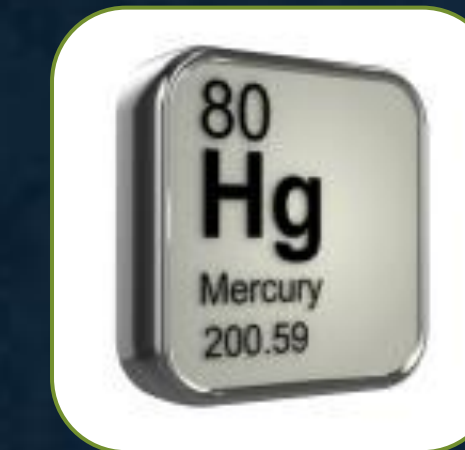


MERCURY POLLUTION AND BORAX SUBSTITUTION IN ARTISANAL AND SMALL-SCALE GOLD RECOVERY PRACTICE

E.U.



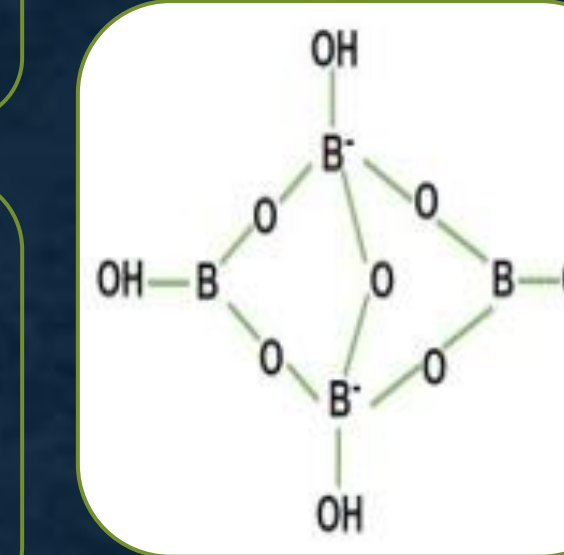
@ 4th Commonwealth Chemistry Posters: 04-05 October 2023



MERCURY

By Evariste Umba-Tsumbu, 4IR Yako Consulting Services Pty Ltd

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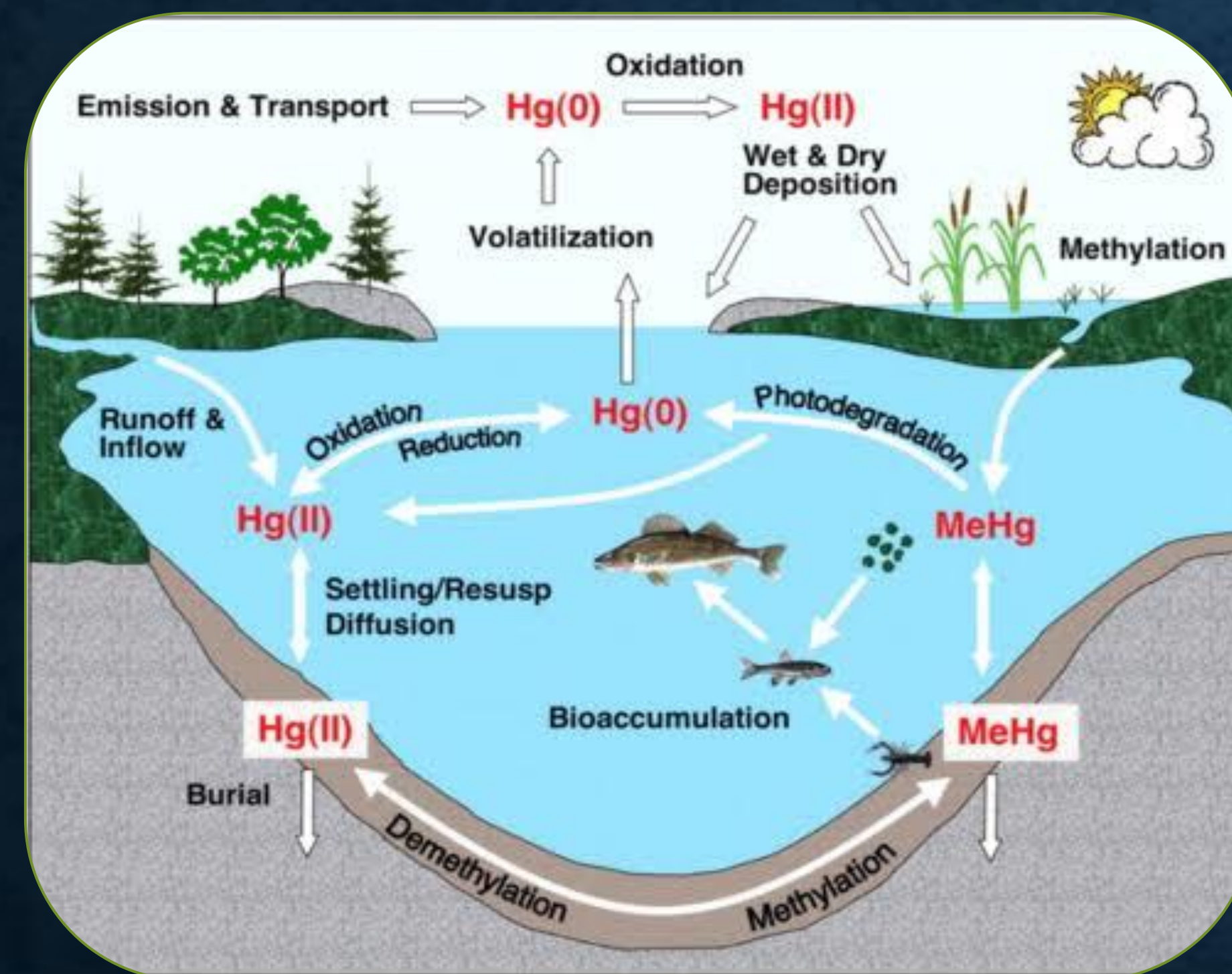


SOCIO-ECONOMIC IMPACT OF ASM

ASM has 30 million of workers producing about 20% of global gold or 600 tonnes against only 7 million workers in large scale producing about 2,400 tonnes of gold globally (Buxton, 2013; IGF., 2017).

UN'S SUSTAINABLE DEVELOPMENT GOALS (SDGS)

SDGS seeks to promote well-being for all ASM (Artisanal and Small-Scale Mining) by Reducing and eventually eliminating mercury use, and by professionalizing and formalizing operations by 2030



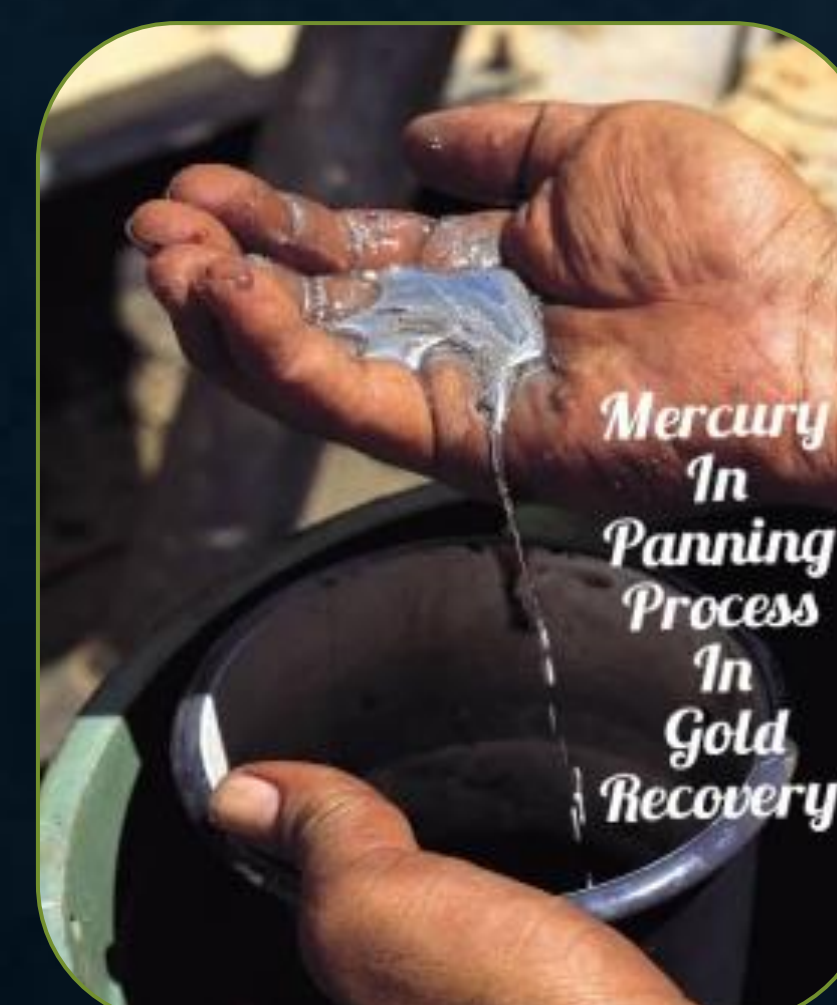
MERCURY CYCLE

Mercury is highly toxic, once in contact with human & environment is transformed into methylate mercury then enters in the soil and seawater to affect the food chain. Kevin Telmer *et al* estimated 1000 t/a are emitted by ASM globally which 350 t/a in atmosphere and 650 t/a into hydrosphere (river, lakes, soils, tailings).

Grade: 6g/mt



Dehybor anhydrous borax method is used in the gold refining industry by 20 MULE TEAM BORAX / Rio Tinto whereby Bullion ingots or gold concentrate/unwrought gold are melted in clay crucibles under an anhydrous borax cover. Oxygen is passed through the metal which then forms oxides of the impurities. These oxides dissolve in the *Dehybor* cover and produce a fluid borate slag. This slag is periodically removed and replaced with fresh *Dehybor*. Further refining steps are then carried out to produce bars with at least 99.8-99.9% fine gold



Mercury & Women
It may affects woman's fertility (New Hampshire Dept. of Env. Sc., 2019)

Peter Appel, Philippines



Refined Gold With Mercury



Refined Gold With Borax

BEYOND MINING

