

2. In treating ore highly charged with sulphide in amalgamating-machines, describe the treatment it would have to undergo to secure a large percentage of the bullion the ore contains.
3. What is meant by concentrating-machinery? How is concentration effected? Describe the different machines and appliances used in this Dominion, their capacity, and the power required to work them.

SUBJECT C.—*The Use of Quicksilver, and Methods of using it in connection with the Extraction of Gold and Silver from Ores.*

1. How do you ascertain when quicksilver is not in a fit state for amalgamation?
2. If quicksilver contained copper, lead, and zinc, or base metals, how would you purify it so as to render it in a fit state to treat auriferous ore?
3. How is gold recovered from amalgamating-plates? State the process it undergoes before it becomes a marketable commodity. Describe fully.
4. What effect has a current of electricity on impure mercury, and how is it applied?

SUBJECT D.—*Cyanide, Chlorination, and other Chemical Processes of recovering Gold and Silver from Ores.*

1. How is the strength of KCN solutions ascertained? Describe fully.
2. What quantity of a 15-per-cent. solution would be required to make up a sump solution of 0.009 per cent. to a working solution of 0.21 per cent. KCN?
3. How many pounds of crude cyanide containing 71 per cent. KCN would it take to make up a sump solution of 0.015 per cent. to a working solution of 0.3 per cent. KCN?
4. In treating pulverized ore with solutions of KCN, how do you ascertain the best percentage of KCN solution to use, and the length of time it requires to be under treatment?
5. In treating fine slimes with a solution of KCN, describe fully the treatment so as to ensure the highest percentage of bullion being extracted.
6. If any of the workmen showed signs of hydrocyanic-acid poisoning, what steps would you take to relieve the sufferer?
7. How is the bullion recovered from KCN solutions? Describe fully the processes from the time the solutions leave the vats until the bullion is made into a marketable commodity.
8. How is gold extracted from pulverized ore by chlorination (a) by the Plattner process, (b) by the Newberry-Vautin process, (c) by the process adopted by the Mount Morgan Company in Queensland? How is the gold from chlorination recovered and made into a marketable commodity?
9. How are concentrates of iron, copper, and arsenical pyrites treated before being submitted to chlorination?

SUBJECT E.—*The Sampling and Testing of Ores.*

1. Describe the principles upon which automatic ore-samplers work.
2. Sketch, with dimensions, a complete assay office used for assay-work in connection with a gold-mill and cyanide plant, showing the arrangement of the different rooms, positions of furnaces, benches, &c.
3. How would you distinguish between the following minerals in an ore:—
 - (a.) Galena and stibnite.
 - (b.) Iron-pyrites and arsenical pyrites.
 - (c.) Calcite and lead-carbonate?
4. Describe briefly the assay of a pure galena for lead, gold, and silver, by fire-method only.
5. State in detail how gold bullion is assayed for gold, silver, and base respectively.
6. A gold-bullion bar is found by assay to contain gold 9520 fine and silver 413 fine: what is its value per ounce for gold and silver respectively, assuming pure gold to be worth 85s. and pure silver 26d. per ounce?
7. How would you determine the presence of acid salts, likely to be cyanicides, in a sample of gold-ore tailings?

SUBJECT F.—*A Knowledge of Arithmetic and the Method of keeping Battery Accounts.*

1. How many ounces of gold are there in a sphere of 5 ft. in diameter, taking the specific gravity of gold to be 19?
 2. The value of bullion from the treatment of ore was £5,678, which contained gold of 0.3265 fine, the balance being silver: show the value of the gold and silver in the bullion, taking gold at £4 3s. per ounce and silver at 2s. 5d. per ounce.
 3. Give the horse-power of a turbine water-wheel to work a crushing-battery of 40 heads of stamps of 11 cwt. each, making 100 drops per minute with 6 in. drop; the wheel to be under a head of 100 ft., and to give 70 per cent. of the theoretical velocity of the water.
 4. Divide 0.0021 by 12, and extract the cube root of the quotient arithmetically.
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