

the Church, leaving him to preach to himself." That God-forsaken and impious crew must have deserved any fate. Our bowels of compassion are moved when we think upon that devoted parson watching his congregation evaporate. Would not our Canadian Lord's Day Alliance have brought these abandoned miners to reason!

"Most of the Mines," continues the righteous observer, "are very well propp'd and secur'd with Timber, so that it is commonly said, There is more Wood underground in Rammelsberg, than in the whole City of Goslar." Mighty vaults were there also, ancient places of worship dedicated to long-forgotten "Sylvian Gods." "In another part hereof is an old Mine, fallen to ruin, call'd The Devil's Mine, by reason (as 'tis said) the Devil used to work amongst the rest of the Miners, to receive his Pay every Week, and to carry away his Share of the Ore: But one day, as the Miners did not share justly with him, he caus'd the Mine to fall to ruin."

Part VIII. of *The Natural History of Hartz-Forest* treats of metallurgical operations mainly, with incidental mention of mining. Here are directions for the traveller: "If you have a mind to see the Mines and Smelting-houses on the Hartz . . . you must go to a House near one of the Mines, to provide yourself with a Guide and a Miner's Dress. First you are carried to a Gabel, or Gapel, to see how the Ore is brought up from the Mines."

The gapel, or hoist-house, was a wooden structure, sheathed with boards or slate, round at the bottom, and resembling roughly a cone. A circle of about sixty feet diameter was covered. In this was arranged a horse-whim. "In the middle (this is the original spelling) of the Area is a deep Hole, wherein is placed a Spindle, on whose upper end is wound about the Chain which brings up the Bucket with Ore from the Mine. Lastly, there goes across thro the Spindle a Beam, to which the Horses are put. When the full Bucket is brought up to be emptied, the Man who governs the Horses drives 'em about, to let down the empty Bucket again, and another full one comes up at the same time."

Windmills had been used. They has fallen into disrepute, however, because of the uncertainty of the wind.

In the "Forehouse," or shaft-house, one could see the shaft "which is about 5 or 6 foot square, which leads you down to the Mine, and is very well secur'd with Timber to prevent the Ground's falling in. Here you go down upon Ladders of about thirty Steps: At the Foot of each there are some Boards placed to rest upon; the Guide going first with a Candle in his Hand. If you care not to undergo this Fatigue, you may be let down in one of the Buckets." No bothersome restrictions in those good times! Nowadays the Ontario miner has to pay for the privilege of riding the bucket.

"The Caves, or places where the Miners dig the Ore," were often as high and spacious as a "middle-siz'd Church." Some of the ore "ran brittle," and was won with hammer and gad. In some places it was so tough that the miners were "obliged to blow it up with gunpowder; which is done thus: They have a long and square Iron Peg, running into a sharp and harden'd Point, with this Iron they make a Hole in the Ore, fill it with Gunpowder, secure the Hole, and put a Thread that is dipp'd in Brimstone to it, which they light on the Extremity, and then run away from it"—a precaution that is even now considered wise. "'Tis a very pleasant sight," continues our author, "to see the Miners, of which there are sometimes Thirty together work-

ing in one place, each of 'em having a Light before him, and the Ore glittering all about 'em."

"An Adit," remarks the sapient doctor, "is a Trench begun at the foot of the Mountain, running into one or more Mines: 'Ts pretty large, both Sides and the Roof are secur'd with Timber, and serve to drain off the Water, to admit fresh Air into the Mine, and to let out the noxious metallic Vapours."

This is the last word on mining. There follow now several paragraphic descriptions of ore-dressing and smelting methods. "To save the expence of Wood and Coals" the impure ore is "stamp'd and wash'd upon the plain Hearth, which is made with several Boards placed in the position of an inclining Plane, to separate the Stone from the Metal.

"The Stamping-Mill-House is a long and broad, but low Building, divided in the midle by a Wall; one Side of the House serving for the stamping, and the other for the washing of the Ore."

The ore was fed into a strong iron-lined trough. Here it was stamped either dry or wet, as the nature of the Ore requires. The Stamp-Hammers, or Pestles, are lifted up by a Wheel, and, to encrease their Force, there is to the bottom of each of 'em fixed a flat piece of Iron of 50 l. weight.

When stamped dry, the ore was passed through a sieve or a Brass Cullender; but when stamped wet it was laundered into a brass vessel with a wire bottom. Thence the crushed material went into "another Trough, where 'tis wash'd so long, till all the stoney Particles are separated from it.

"What remains in the first Trough is clean'd in the following manner: In the other partition of the Building there are several inclining Plains, or plain Hearths, which are cover'd with coarse Linnen; the Ore in powder, just now mention'd, is put upon the upper end, and the Water running upon it, 'tis wash'd down from one Plain to the other, till at last all the metallic Particles subside to the Linnen, and the Stone is carried by the Water into the Troughs at the foot of these inclining Plains; but as this carries still some Metal with it, they let it run from thence into large Reservoirs, where they allow it time to settle: And when they have no Ore to stamp, they put it again under the Stamp-Hammers, to wash it as before, to separate the Metal entirely from the Stone.

"The Ore subsiding upon the uppermost Board of the Plain Hearth is pure Metal, but that of the second, third, etc., is wash'd over again.

"This Labour is perform'd by little Boys and Girls." All of which goes to prove that our predecessors knew something about the commercial aspects of ore treatment. The flow sheet signified above probably implied an effective, cheap and suitable method of milling the Hartz-Forest ores, and certainly the labour could not have been exorbitantly costly.

We now come to considerations metallurgical. The roasting ovens stood, with all the other reduction equipment, in one large building. "The Oven is made exactly like a Baker's Oven, only bigger: Herein they make a Fire with split Wood, and sling the last washings of the stamp'd Ore in it; then burn it twelve hours, to clear it of the unripe, volatile and poysonous metallic Particles; for otherwise both the good and bad would fly away in Smoak in smelting." Part of the sulphur was condensed, purified, and made into the brimstone of commerce. Open heap-roasting was also resorted to.