

with salt alone as flux, until I had destroyed much of the base metal. I then cut off a small piece as carefully as I could, weighed it, adding fine silver of the same weight, and six times the weight in lead. I melted the whole together in a bone-ash pot. In this way all the impurities were got rid of by the lead carrying it into the porous parts of the pot, leaving a clear bright bead of metal. Taking the cupel or pot from the furnace, and allowing the bead to cool, I found I had an alloy of pure gold and silver, which I again weighed, and calculated the loss of base metals. The bead, I now flattened and annealed, so that I could bend the strip into coronet shape. Then, with strong nitric acid, I separated the silver as chloride of silver. My coronet now presented a porous sieve-like appearance. I carefully poured off my chloride and preserved the same, so as to extract the silver at a more convenient time. My coronet or porous sieve-like fine gold I washed and shrunk by annealing. The fine gold weighed and calculated by the weight of the piece operated upon gave as the result so much fine gold in a given weight. An independent assay master reporting upon the same bar of metal gave as his report, 10 oz. 16 dwt. 5 grs. to the lb. troy, against mine of 10 oz. 17 dwt. 4 grs. to the lb. troy. The very slight difference I attributed to my imperfect weighing. There are other means of making assays, but not having practical experience in the process, I will not attempt to describe them.

The silver assay I made much more easily; but the same applies to silver as to gold, viz., careful weighing. Accurately weigh the piece of silver to be reported upon, add as much lead as the appearance of the quality of the metal justifies. If tolerably good, eight or ten times the weight will be sufficient; if very base, considerably increase the weight of lead, melt the silver and lead together in a porous cupel, as we did the gold, in a furnace at high temperature. In a short time the lead would have carried with it all the impurities into the porous parts of the pot, leaving a bright bead of fine silver, which, being weighed and calculated by the loss in the first weighing, gives as the result so much fine silver in the pound troy. A parting assay requires greater care, although made in much the same way as gold. I will give it in the words of Makins, late Assayer to the Bank of England:—

"In addition to the operations of assaying for the amount of silver or gold as already detailed, there are cases where it is required to estimate silver contained in gold, and also gold in silver, such are called 'parting assays.' The latter, viz., that of silver contained in gold, is effected by simply dissolving the metal in dilute nitric acid, and collecting the gold powder left; this is then to be washed with boiling distilled water, and annealed to brightness, when it will be in a state for weighing.

"The valuing of silver in gold is somewhat more complex. A double gold assay is made in the usual way, and at the same time an assay pound of the metal is cupelled with no silver added. Thus the copper and oxidizable metals are removed, and the button left will be composed of the gold and silver of the specimen only. The difference of weight of this above the parted assay will of course be due to silver."

The annual waste of the precious metals is enormous. In the first place, we have something like 80,000,000 silver coins in circulation. If we take the loss on each at 1-100th part of a grain, we get a loss of 1641 oz. of silver every year from our English coinage alone. Still keeping my estimate at the 1-100th part of a grain for the whole of Europe, we get a loss of 9,846 oz. Taking four times that amount for the whole of the known world, we get a positive loss of 80,884 oz. from the circulation of silver coinage alone.

Photography, an art which is, perhaps, the greatest destroyer of silver, we will consider next. Taking all the cities and towns in England together, we have an average of about 150 photographers in each. Supposing each to consume (a very low estimate indeed) 10 oz., we get an annual loss of 450,000 oz. in England alone. Considering the magnificent works of art we receive from the continent and America, we multiply the amount five times for America and other countries of the world, and get a loss in photography of 2,250,000 oz. yearly. From the most reliable shipping returns, we learn that there is an average loss of about 2,000 vessels every year. These vessels carry gold and silver in some form or other, either in coin, watch-cases, jewelry, or plate, so we may reckon the average loss with each vessel at 80 oz., making a total of 60,000 oz. lost in the waters of the deep. The losses by fire are considerable; the wear from watch-

cases and articles of daily use, the enormous loss in the manufacturer's work shop, and other minor losses, we should not over-estimate at 200,000 oz. throughout the world.

From the underestimated sources I have named we have an annual loss of silver amounting to 2,540,884 oz. Considering the value of gold, the loss of this metal is proportionately greater.

Gold is used in a greater number of trades than silver, and in most of them little or none is ever recovered. Taking our gold coinage in circulation to be about 70,000,000 pieces of coin, estimating the yearly loss by abrasion to be 1-10th part of a grain for sovereigns, and 1-20th part of a grain for half-sovereigns, we get an annual loss from coinage in England of 12,868 oz.; and to be on the safe side, I will only take five times as much for the rest of the known world, and that will show the loss from gold coinage to be 64,340 oz.

The consumption of gold in the potteries and glass factories is enormous. We will take 860,000 oz. as the loss from potteries and glass, 8,500 oz. as the amount used in photography, and 400,000 lost in gilding. The loss from watch-cases, chains, and jewelry, and loss in the workshop and other minor causes, we must give at another 400,000 oz. From these figures we get an annual loss of gold amounting to no less than 1,167,840 oz.

RINGS AND THEIR HISTORY.

Capricious as are the freaks of fashion in dress and personal ornaments, it has been able to work little change in the habit of wearing rings since the world first took a fancy to them. The material and workmanship alter with the advance of art, but the ring itself, from its regular beauty apart from all superstitious, sentimental, or mystical associations, must ever be a cherished ornament. Rings have always been the favourites of princes and ladies. The history and poetry of finger rings are laid up in numerous learned treatises, which few people would dream of perusing. Enduring as the rings are, their antiquity reaches far beyond the oldest we can see in the museums. The earliest mention of their use occurs in the Book of Genesis some 1727 years B. C., but it is quite possible that even the mythical prehistoric man wore a ring. We afterward hear in the sacred records of Pharaoh's ring, and