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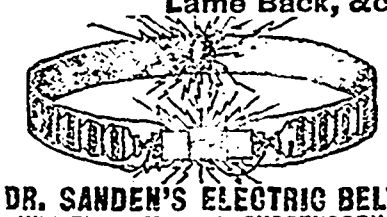

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(Continued.)

Scorification Assay.—This method is used in very rich ores in preference to the fusion method. It consists in taking about 50 grains of ore passed through a sieve having 80 meshes to the running inch (in the event of metallics they are treated as already described) and thoroughly intermixing it with four times its weight of fine granulated lead; this mixture is placed in a scorifier or shallow dish made of the fire clay which has been previously thoroughly dried, and on the top of the mixture of ore and lead about 150 grains of granulated lead are placed; the scorifier is then placed in a muffle, the door closed and the temperature raised; after about ten minutes the door is taken away and a large piece of charcoal placed at the mouth of the muffle to keep the temperature high and at the same time allow plenty of air to enter the muffle. The lead oxidizes and the molten oxide acts on the gangue of the ore and fluxes it away. This operation is continued until the slag completely covers the lead; a cigarette paper containing 15 grains of anthracite is then dropped on the molten slag. This reduces some of the lead oxide to the metallic state, and cleans the slag of any small particles of gold which failed to come in contact with the lead in the earlier stages of the operation. When bubbling has ceased and the mass becomes quite tranquil it is poured into a mould and the scorifier put back into the muffle. If the button of lead obtained is too large for cupellation it is put back into the scorifier and the operation continued until it is sufficiently reduced in size for cupellation. It is then poured and when cool the button of lead is detached by a blow from a hammer, cleaned by hammering and brushing with a tooth brush and then treated in the same way as the button obtained from a fusion assay. When the ore is sufficiently rich scorification is undoubtedly the more accurate method of assaying, because the slag at the end of the operation never contains any oxy-sulphides, and therefore seldom retains the slightest trace of either gold or silver. Poor ores may be treated by scorification by having several lots of ore scorifying at the same time, and then scorifying all the buttons of lead obtained together until sufficiently reduced in bulk for cupellation, but this method is a long and tedious one and will not recommend itself to the assayer when time is an object.

Scorification After Fusion.—In some cases the button obtained from fusion is hard and brittle, owing to the presence of other metals reduced during the fusion such as copper, bismuth, etc, and it is impossible to completely detach it from the slag without injuring the button and possibly losing some of the auriferous lead; in such cases the buttons are subjected to scorification with pure lead (the quantity required varying with the amount of impurity in the button) and the operation is repeated until the lead becomes malleable through the removal of the other metals.

Molten oxide of lead is a solvent for most other metallic oxides and carries them away into the slag; it fluxes off the silica as silicate of lead. A little borax (preferably previously fused) is often added with considerable advantage to assist in fluxing off metallic oxides, for which in the molten state it is a powerful solvent.

Concentrations.—It is often advisable to concentrate ores before treating them for the extraction of the gold. Some ores cannot be concentrated without very considerable loss of gold, while others are easily concentrated and no appreciable quantity of their gold need be lost during the operation. When the gold is in a very finely divided state it is almost impossible to concentrate it without large quantities being washed away as float gold. Ores most suitable for concentration are those in which the auriferous portion, metallic pyrites or some other mineral, possessing a much higher specific gravity than the gangue is associated with. Such ores which originally had only a few penny weights of gold per ton can be concentrated up to several ounces per ton before treatment for the extraction of gold. Great improvements have lately been made in mechanical concentrators, and although it is impossible to make experiments on a laboratory scale to give any very definite result as to the extent to which the ore can be concentrated, yet a good deal may be gleaned as to the suitability of the ore for concentration, by the aid of an ordinary gold-washing pan and vanning shovel.

Take for the experiment a weighed quantity of ore (say about four pounds) which has been crushed through a sieve having 80 meshes to the running inch, put it in a gold-washing pan and add about twice its weight of water; thoroughly mix with the hand and allow to settle for a few minutes, then pour off the muddy water, repeat this operation until the ore settles down rapidly and on standing for a few minutes leaves a comparatively clear liquid above it, then decant the water off, dry and weigh the ore; next thoroughly mix together and make an assay of the concentrates. Supposing the concentrates weigh one pound and four pounds of ore were originally taken for the experiment; then if no gold has been lost during the operation the concentrates should be four times as rich as the original ore. If this operation has been successful the concentrates may possibly be still further enriched by the aid of a vanning shovel.

Take a quarter of a pound of the concentrates from the previous experiment and van them using about half an ounce at a time. The process of vanning is not an easy one to acquire, many assayers have different methods of using the instrument with equally good results; the principle of the operation is to put about half an ounce of ore on the shovel, thoroughly wet both the ore and the surface of the shovel with water, then with a rapid eliptical motion with a slight jerk back when the water is running down towards the point of the shovel, the heaviest particles are made to collect on that part of