All monies collected will be duly acknowledged in the Journals.

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THE USE OF RESIN, &c., FOR THE REDUCTION OF CHLORIDE OF SILVER.

BY F. W. HART.

IN the process of reducing silver for testing purposes, recommended for use with my Volumetric Apparatus, the chloride is reduced by nascent hydrogen formed in the decomposition of water, the zinc or iron being oxydized (at the expense of the water) before the sulphuric acid can dissolve it; by this means the other element composing the atoms of water is liberated, and then immediately combines with the chlorine of the silver salt, which is split up, leaving metallic silver.

Most reductions from solutions, except in the case of electro depositions, are pulverulent, and require an after application of intense heat to bring the particles into a solid mass. This fact renders desirable a method of reduction which does not involve two operations. Discarding the common methods, I adopt a plan similar in principle to that I have just explained. In the method I am about to describe, hydrogen still performs the function of a reducing agent, but the final result is pure, bright, and solid silver.

It is well known that most substances burning readily contain a large proportion of hydrogen, such are naphtha (liquid), paraffin (solid), asphaltum (solid), and resin from turpentine. The two latter will suit our purpose best, being easily reduced to powder. Proceed as follows:—

1st. Let the chloride of silver be well washed, by pouring on successive changes of water, to rid it of soluble matters; then pour on a filter to drain, and, finally, well dry and powder fine.

2nd. Take two ounces of this fine powder, and one ounce of finely powdered asphaltum or resin, mix them intimately; passing through a tolerably fine sieve twice does the work well.

3rd. Have ready a good smooth assay melting crucible,* which may be filled nearly full, as there is no boiling over to be feared, as, with the ordinary processes at first, apply a gradual heat. A portion of the decomposed hydrocarbon not taken up or in excess of the chloride will burn on the top, so no fear may be entertained from its appearance. It may now be placed in the most intense part of the fire, and about two drachms of powdered calcined borax is then sprinkled on the mass. When it has lost the appearance of powder, press the mass down round the sides with a stick of wood, consolidate the fire (of coke), in which the crucible must be immersed to the top, on which place a large piece of hard coke and keep at a white heat, from ten to fifteen minutes, when you may expect the operation to be completed. The silver will be found in a button on breaking the crucible, when cold, or it can be poured out and the crucible preserved for another operation.

In conclusion, a few words on the management of the fire and stove *in ordinary use* best suited for the purpose may be acceptable. The coke should be chosen of a medium density. Do not use the soft, black kind. Break it in pieces about the size of a hen's egg. Before placing the crucible finally, have the grate three or four inches deep, of a good, *solid, bright fire;* then pack round the crucible, closely, smaller pieces of coke, bed up to the mouth, and cover, as before mentioned, with a good piece of coke. Keep the grate clear *from the bottom*, removing the ashes by gently raking now and then, that the current of air may not be impeded.

Of stoves, the round, close wrought-iron ones are first to be chosen, as in them sufficient heat can generally be obtained to melt 3 or 4 ounces, without the aid of blowing. In the small American Queen Stove, now much used in photographic rooms, can be melted between 2 and 3 ounces by gentle application of blowing—the top doors slid close. If an ordinary fire-place be used, choose one where the fire is at least eight inches in any direction.

[Mr. Hart, at our request, made an experiment, for the purpose of testing the completeness of the return of silver obtained by this method. A small sample of chloride was carefully analyzed by means of his Volumetric Apparatus, and found to contain a per centage of $60\frac{1}{10}$ of metallic silver. Of the same sample of chloride, 45 grammes were then taken, and reduced as above described, and gave a button of pure silver weighing 60 per cent. of the original amount of chloride, besides a few small beads adhering to the crucible. This was effected by exposure for about a quarter of an hour to the heat of a small furnace, without artificial draught.—ED.]

* Should any difficulty be experienced in procuring good, smooth crucibles in the country, Mr. F. W. Hart informs us that he will be happy to supply them to provincial photographers.

ON THE STRENGTHENING OF COLLODION NEGATIVES.

BY M. MC A. GAUDIN.

IT is the opinion of most chemists that negatives on collodion are formed of particles of reduced silver in a state of infinite division, which are lodged in a network, or kind of spongy body, formed of collodion rendered insoluble. It is quite certain that every particle of the silver formed by the reducing agents is external on the substance of the collodion, for unless it were so, it could not be formed; and it is evident, that in a picture on collodion there are two superimposed layers; the one below, composed almost entirely of spongy collodion, and the other uppermost, composed at first of iodide of silver, then, after fixing and washing, of a seed plot of reduced silver, which insinuates itself, as it were, in the interstices of the subjacent collodion.

This reduced silver possesses peculiar properties, due, doubtless, to the particles of iodide of silver unattacked by light with which it is united, before the fixing in hyposulphite has caused it to disappear. Whatever it may be, it is certain that in presence of the energetic reducing agents which have produced it, and which are renewed, pyrogallic acid, sulphate of iron, &c., this silver, I repeat, augments its bulk regularly over the entire surface of the picture, and causes the intensifying which is successfully practised now-a-days, whenever the first development does not produce the desired intensity in a picture. Even after fixing, certain salts of iron increase the mass of silver indefinitely, such as, for example, the proto-nitrate of iron, under certain conditions.

I have, for a long time, thought of obtaining intensifying by means of electricity, perceiving in it a means of arriving also at an indefinite increase of the silver already deposited. I made the attempt on several occasions without attaining any success.

The cause of my non-success, and the means by which I succeeded, are as follows.

Forced to reflect upon this singular refusal to take silver, gold, or any other metal, easily reducible by the pile, when metallic contact is well established, in the region of the sky, for example, or the silver is so dense that, upon rubbing with a tuft of cotton this region in a proof well washed and dried, we obtain a highly reflective surface, in some respects, a silver mirror, I said to myself, this surface appears very metallic; it is also almost impervious to light, and this it is which makes it fulfil its function; it allows only a bluish tint to pass, like silver deposited in a very thin film upon glass. Nevertheless, it is not completely opaque, since, in printing, we are obliged, when wishing to obtain perfect whites, to cover this region with a coating wholly impervious to the chemical rays, such as China ink, chromate of lead, &c.; therefore there must be a reason for it, and, in fact, there is only one which is found verified by the knowledge we