"I see in Mr. Heath's remarks before the Photographic Society, that he complains of being unable to obtain intensity in the intensification of an iron developed negative during his enlarging experiments, and invites suggestions thereon. I have obtained good printing qualities from the weakest negatives by the application, first of bichloride of platinum, and iodide of ammonium, and then, after thorough washing, bringing up both detail and intensity by the use of pyrogallic and silver. Or, after the application of the bichloride and iodide, pouring an acid solution of silver on and off the plate, and then, re-applying the bichloride and iodide as before, bichloride of mercury has answered in my hands as well as the platinum.

"I must not conclude this letter without mentioning that I feel indebted, in a great measure, for whatever successful results I have obtained, to the invariable excellence of the chemicals supplied to me by Messrs. Hopkin and Williams. I had, and still have in my experiments, myriads of failures; I never do a day's work without learning something, or noting some important fact, and it all leads to my being convinced of one fact, viz., that the purity of the nitrate of silver bath is the all important foundation of perfect photography; and that to attempt to work a delicate instantaneous process on large plates would simply be a waste of time without the use of pure silver. Many things tend to put a bath out of order, bad ether, bad distilled water, and, in fact, many causes, the discussion of which, I will not trouble you with at the end of so long a letter. But start with pure silver, and keep deteriorating causes as far as possible from the bath, and what a difference one finds between one's work, and the unhappy wearying state of things which the use of bad chemicals entails.

"I have used Messrs. Hopkin and Williams's preparation of pure nitrate of silver constantly during the last year, and have found every sample equally good, as well as all the other chemicals that I habitually use of their preparation.

"I may mention, that a sample of silver from Messrs. Bailey gave also very satisfactory results, and the collodion with which I have principally worked the process alluded to above, has been a mixture of one of Mr. Rouch's manufacture according to Mr. Hardwich's formula, and a preparation of my own. These two I mix in various proportions, according as it seems fit.

"I think I had better leave off, or I shall be induced to begin on the subject of collodion, and bore you utterly to death, so I shall beg you to believe me, very faithfully yours,

STUART WORTLEY."

PHOTO-CHEMICAL RESEARCHES UPON THE SALTS OF SILVER.

BY DR. D. VAN MONCKHOVEN.

THE history of the salts of silver is one of the most curious that can engage the attention of physicist or chemist. A common property, so to speak, that of being decomposed under the influence of light, distinguishes the salts of silver, generally, from the salts of all other metals.

It must not be supposed that, beside the salts of silver now employed in photography, there are not other salts susceptible of similar application. This would be a serious error, and the object of this essay, which is a summary of elaborate researches during many years, is to show that it is more than probable that the processes now adopted will receive many important modifications.

Our desire is to aid earnest experimentalists by pointing out to them the route they should follow. They must, indeed, be thoroughly imbued with this idea, that research becomes fruitful only in proportion as the thought precedes the experiment. The following, then, is the order to be pursued in a given research.

For example, Suppose it be desired to substitute more rapid collodion processes than any of those now in use. The process to find is threefold. First, to substitute a more sensitive salt for the alkaline iodide, or rather, to compose a silver bath with a soluble salt of silver, which is more readily decomposed under the influence of sulphate of iron, or, what would be still better, to discover a new developing agent, which will permit the time of exposure in the camera to be diminished.

The experimentalist will perceive, upon reflection, that these are the only processes possible. It is not the addition of new alcohols or other substances that will give greater rapidity. There remains then the substitution of a salt of silver for the iodide of this metal. Certain considerations thereupon present themselves which it is important not to lose sight of.

The salts of silver divide themselves into two very distinct categories. The first includes the salts directly sensitive to light, that is to say, those which, when exposed to daylight, assume a violet hue after a few moments' exposure. It will be remarked that, strictly speaking, the iodide of silver is scarcely sensitive to light, while the chloride and bromide blacken very rapidly.

The second category includes those salts of silver which are easily reduced after being exposed to light, and it seems that the salts possessed of this property are very little endowed with the first. Thus, of three collodions prepared exclusively with a chloride, a bromide, and an iodide, the latter will be the most rapid, while the bromide will be slower, and the chloride much slower still—in contact with the developing agent be it understood.

Under the direct influence of light it is the bromide that becomes coloured the quickest, then the chloride. As to the iodide, it is only slowly that it assumes a light grey hue.

Among the salts of silver which may be substituted for the chloride of silver for use under the action of direct light, as in positive printing for example, we may mention the chloroacetate of silver, the cholate, the malate, &c. We shall, however, recur to these in other articles upon this subject, for the present, the better to show the importance of these researches, we shall instance a familiar example.

To whom has it not occurred, while preparing positive paper, to touch the paper with his fingers? Now persons who perspire freely stain the paper they touch. But if we experiment with the paper so touched, we shall find that it possesses greater sensitiveness to light. If we collect the perspiration with a hair-pencil, and spread it upon the surface of the sensitized paper, we shall perceive that it very rapidly augments the action of light upon the chloride of silver.

Analysis clearly demonstrates the presence of chloride of sodium in the perspiration, but this is not the cause of the acceleration of the luminous action, it is due solely to organic matter.

If space permitted, it could easily be shown, by curious examples, that we are very far from having attained perfection in our present method of printing positives; on another occasion we shall enlarge upon this subject.

With respect to the salts of silver, which are developed after a short exposure to light, a strange fatality seems to prevail, namely, that we have at first sight hit upon a salt unique in its rapidity. In fact, among the hundreds of experiments we have made, no compound, after a very short exposure, developes so well under the influence of reducing agents. From this point of view, the question becomes difficult.

Our researches have led to the discovery of salts of silver perfectly fixed in the light; that is to say, of such as do not in the least change colour after many days' exposure to the sun. Among these we may mention the cobalticyanide, and the sulphomellonate, which after exposure to the sun for several days remain perfectly white.

The most curious salt is the resinate of silver, which may be very readily prepared. This substance enjoys the very curious property of being soluble in spirits of turpentine. This solution, spread upon paper, leaves resinate of silver in