

exhausted with alcohol sp. gr. 0.81. The iodide of potassium dissolves, leaving the iodate undissolved. Upon solution in water and recrystallization the iodate may be obtained pure. It forms small white cubical crystals which are anhydrous, and are unaltered in a dry atmosphere. At a low red heat it melts and evolves 22.59 per cent. of oxygen gas, being converted into iodide of potassium. The residue, however, is generally alkaline, owing to the escape of iodine along with the oxygen. Sulphuretted hydrogen also converts the aqueous solution of this salt into iodide of potassium with deposition of sulphur. This method, however, does not yield it sufficiently pure for photographic purposes, as it is almost impossible to get rid of the sulphur compounds formed at the same time. When heated with hydrochloric acid, chlorine, and afterwards iodine, are evolved, and if sufficient of the acid is employed, chloride of potassium alone is left; an intermediate compound of ter-chloride of iodine with chloride of potassium being however produced. Iodate of potash dissolves in thirteen parts of cold water, and more readily in a solution of iodide of potassium. Its presence in commercial iodide of potassium may be easily detected by adding a little sulphuric acid to the solution. In either salt separately this acid produces no marked reaction, as the liberated hydriodic and iodic acids are colourless; when, however, they both are liberated together in a solution, the oxygen of the iodic acid unites with the hydrogen of the hydriodic acid forming water and liberating iodine, which communicates a reddish brown colour to the liquid.

Bromate of potash.—The same remarks which we have made above respecting iodate of potash, apply equally well to bromate of potash. It is formed by saturating a moderately concentrated solution of potash with bromine. The greater part of the bromate of potash crystallizes out immediately, and the rest may be obtained by evaporation, whilst nearly all the bromide of potassium remains in solution; it may be purified by recrystallization. Bromate of potash forms crystals belonging to the regular system. At a red heat it evolves ten per cent. of oxygen gas, leaving a residue of bromide of potassium. It is decomposed by acids in a very similar manner to chlorate of potash.

Fluoride of potassium.—The best method of obtaining this salt consists in mixing hydro-fluoric acid with carbonate of potash, leaving the acid in slight excess; the liquid must be evaporated to dryness in a silver or platinum vessel, and heated strongly to expel the excess of acid, it must then be dissolved in water, and crystallized by evaporation at a gentle heat in a platinum or silver dish. Fluoride of potassium crystallizes in long radiating crystals which deliquesce rapidly in the air, are very soluble in water, but insoluble in alcohol; they contain 39.44 per cent. of water. This must be borne in mind when weighing out crystals for photographic purposes.

Oxalate of potash.—This salt is frequently used in photography, both by itself and as a source of oxalic acid. It is obtained either from vegetable juices, such as sorrel, &c., in which it exists in the form of binoxalate, or by the direct union of oxalate acid with potash. In the ordinary state in which they are obtained in commerce they contain two atoms of waters. Upon being heated the whole of the water goes off, and after being heated to redness the salt leaves a residue of carbonate of potash; the crystals dissolve in three parts of cold water. The commercial salt is usually very pure, it is not likely to contain any impurities which are not removed by recrystallization.

Binoxalate of potash is produced by dividing an aqueous solution of oxalic acid into two equal parts; exactly neutralizing one of them with carbonate of potash, and adding the remaining oxalic acid to it, the salt crystallizes out upon evaporation; it can be purified by solution in water and recrystallization. In this form the salt contains two atoms of water, and crystallizes in the oblique prismatic system, it is permanent in the air, and has a sour, rather bitter taste; it dissolves sparingly in cold water, and in fourteen parts of boiling water. Boiling alcohol likewise dissolves a small

quantity of it. It is to the presence of this salt in the juice of sorrel and various species of oxalis and rumex that the pleasant acidity of their juices is owing.

Quadroxalate of potash is formed by dividing an aqueous solution of oxalic acid into four parts, neutralizing one of them with carbonate of potash, and adding the other three parts to it. It separates in the form of very acid needles, often of great size, which require about twenty parts of cold water for their solution. The compound known among druggists as salts of lemon, and largely employed for removing iron moulds and other stains from linen, generally consists of this salt.

WET OR DRY COLLODION.*

BY M. L'ABBE DESPRATS.

On the part electricity plays in photographic manipulation.
—We have now arrived at the developing solution, at that stage of our operations which is at the same time so interesting and so mysterious. The sensitive film, acted upon by light, upon its removal from the camera, contains a latent picture, which we proceed to render visible. What is the action of light upon the sensitive film? what is its nature? And as this action is real, although invisible, what are the means of completing it, and of rendering its effects apparent to the eye? Hitherto, a decided reply has not been given to the first question; as to the second, it is, if not perfectly, at least very nearly resolved. However, as these two questions have an evident connection, we may say that the solution of the latter will be really perfect only on the day when the first has become fully elucidated. We have certainly no pretension to raise the thick veil beneath which the luminous operation takes place; but there is, it seems to us, no doubt that electricity plays a very important part in this case. In admitting that, in photogenic phenomena, electricity concurs with light, it will, it is true, always be very difficult to establish its particular action, but when it has been proved that this action exists we should take account of it, and seek the means, either of regulating its effects, or of rendering it more efficacious. It is this consideration which has determined us to give a summary of the experiments we have made in this direction.

It may be admitted, as a general law in physics, that every change, in the state of a body, is accompanied by a rupture of the equilibrium of their electric condition. Combinations, simple or complex, are the most powerful sources of electricity, but they are not the only ones, the passing of solid bodies to the liquid state, from the liquid to the gaseous, and reciprocally, also furnish signs more or less appreciable of electricity. In the various circumstances where electricity acts by shocks, science furnishes the means of measuring the fire in a very vigorous manner, in others on the contrary, when, for example, the electric action is slow, it is not possible to employ the same means of appreciation. Nevertheless when, after the lapse of a time more or less considerable, entirely new compounds have succeeded those under consideration, analogy compels us to admit that they are the effects of a similar cause, the action of which, always fruitful, is slow only from the fact of the circumstances under which it is forced to act. Reflecting ever so little upon the whole of the different manipulations which concur to the formation of a photographic picture, we perceive that they all have the effect of producing new combinations of known elements. We see, also, that these combinations, which, for the moment, seem perfectly definite, are, nevertheless, unstable; from this we are led to conclude that if as first there is electricity by shocks, there is also a slow action which reacts upon the result produced by the first. This second action, silent and persistent, may sometimes be very favourable, but more frequently it betrays itself by effects the more disastrous, inasmuch as the electro-motive force causes are very often concealed and inappreciable. In our opinion it

* Continued from Page 66.