natural colours; indeed, in the case of a landscape, we have often seen them have the effect of views when seen at sunset. This, although so far satisfactory, makes no difference as to its printing qualities, only that when we get negatives with this coloured surface we may be sure the bath is in good working order.

The developer recommended for use with this bath and simply iodized collodion is as follows:—protosulphate of iron, ten grains; glacial acetic acid, thirty minims; water, one ounce; a drop of the strongest liquor ammonia being added when the whole is mixed. If the negative be too dense, the proportion of ammonia is to be reduced; if too weak, increased.

The advantages claimed for the direct negative process, are that the process is simpler, the results are more under control, the exposure not much longer than with bromo-iodized collodion, and that the negatives are better and more vigorous.

We do not intend to enter here into a discussion of a subject we have so often treated, further than to state our conviction, that whilst Mr. Matheson invokes for his favourite process a fresh trial, he does not appear to us to have given the method now almost universally in use, with bromo-iodized collodion, by any means such a fair trial as is necessary for a discussion of its merits. We arrive at this conclusion as we peruse his book. In comparing, for instance, the simplicity of his own process with that now commonly used, it never seems to enter his calculations that negatives are frequently obtained by means of bromo-iodized collodion, with quite sufficient printing vigour, without any process of intensification. As to the comparative excellence of the two classes of negatives, we are scarcely surprised that he should prefer his own and speak of the rough granular looking deposit on the others; for, on examining his instructions for producing negatives with bromo-iodized collodion, we find, what he must pardon us for styling, a general slovenliness in the operations. He says, for instance, "a little old positive bath kept in a small bottle is a very convenient way of having at hand the silver used for blackening." Again, "the pyrogallic acid solution should be rather strong—say, ten grains to the ounce of water, controlled by a little citric acid—say, a lump the size of a horse-bean to half a pint of solution." If he have been in the habit of using old silver bath charged with iodide of silver for intensifying, we do not wonder that the negatives have a granular surface; we cannot indorse either his recommendation to use citric acid by the "lump," nor his statement that citric acid gives a colour favourable for printing, as in truth the blue tint it confers readily permits the actinic rays to pass, and practically reduces the strength of the negative.

One of the methods given for intensifying is to pour over a fixed positive "a solution of bichloride of mercury either in alcohol or dilute hydrochloric acid; after the film has been properly acted upon to the satisfaction of the operator, wash off all traces of bichloride of mercury with water; then pour on a very weak solution of hyposulphite of soda, which will turn the deposit into an intense black." Now as bichloride of mercury is soluble in water to the extent of 30 grains to an ounce, a greater strength than it is desirable for photographers to use, the employment of either alcohol or dilute hydrochloric acid is unnecessary and mischievous, as the latter render the film rotten, and the former renders necessary an amount of washing which loosens the film, and thus causes one of the evils, the occasional loss of films, which he charges on the process generally. We might quote more to show that the writer either was not familiar with the process he condemns, or that he had practised it in a very slovenly fashion; but we have said enough on that subject.

In treating of his favourite direct negative process, Mr. Matheson is much more satisfactory, and for those who are wishful once more to try that method we can recommend him as a most satisfactory companion and guide. We must add, moreover, that he discusses the questions with the utmost candour, and straightforwardness, and fairness.

In the printing process he recommends an alkaline gold solution with a little more than two grains of bicarbonate of soda to each grain of chloride of gold, which, he states, if kept three or four hours before use, tones perfectly, without any tendency to mealiness. It has the disadvantge of not keeping longer than that time. He recommends also the dangerous plan of using old hypo solutions, strengthened from time to time, in order to avoid loss of tone, in preference to the constant use of fresh solutions.

A chapter on Photography in Tropical Climates, based upon the author's own experience in India, is excellent, and only too short. It will be read with great interest by all who wish to practice the art in hot climates; many of the hints it contains may be noted with advantage for observance during the heat of summer in this country. The remarks on glass houses are, for the most part, thoroughly intelligent and to the purpose. The form of room recommended, of which a design is given, is one of the best we have seen. We should have preferred the side lights down to the ground, especially for card portraiture; but with that exception we consider the room perfect. On another page we give the chapter in its entirety, and are enabled, by the courtesy of Mr. How, the publisher, to place the diagrams, illustrating what to avoid and what to build, before our readers.

ON THE ACTION OF PHOTOGRAPHIC VARNISHES UPON THE COLLODION FILM.

BY DR. D. VAN MONCKHOVEN.

It frequently occurs that the varnish completely removes the intensity of the image on the collodion. The aim of this short article is to point out the cause of this phenomenon, and to indicate a method of remedying it.

When a collodion plate, upon its removal from the camera, is covered with the developing solution, the image, as is well known, gradually appears. Many persons imagine that the image formed penetrates the film, but this is not the fact, for, upon examining the film on the back of the plate, we perceive that the iodide of silver remains perfectly white.

The luminous impression is confined to the surface of the sensitive film, and does not penetrate its substance; besides, the silver deposited by the developer superficially swells the fibres of the gun-cotton, and forms an image in relief.

The developed image may, therefore, be considered as formed of two films; the first, constituted by the pyroxyline and iodide of silver, unchanged; the second, by the metallic silver; some traces of iodide of silver, which, before the development, constituted the most superficial part of the film; and, lastly, a very small quantity of pyroxyline, the fibres of which are distended by the deposited silver.

Now we must not forget that gun-cotton is partially soluble in alcohol, benzine, and several other liquids, especially when they are thoroughly deprived of water. Anhydrous alcohol, at 42°, for example, dissolves a large proportion of pyroxyline, while alcohol at 40° dissolves only traces of it, and alcohol at 36° none at all.

Now, in the manufacture of varnish, it is necessary, in order to dissolve the resins which form their basis, to employ alcohol at 42°. What takes place, then, in making use of such a varnish? Why, it dissolves the superficial part of the collodion film, and the image is either wholly removed, or, as frequently happens, its intensity is greatly diminished. The first case is easily explained; the second is intelligible when we consider that the molecules of silver forming the image are at first spongy, then, suddenly, by the removal of the pyroxyline, reduced to the state of boil, which necessarily opposes fewer obstacles to the passage of the luminous rays. Not only spirit-varnish, but also those containing benzine frequently present this defect, and recently, M. Vidal, in employing the excellent varnish described by us some years ago, viz., amber, torrefied at 300° C. dissolved in benzine—informed M. Deltenre, the